

AN EXAMINATION OF THE QUALITY OF CURRENT
AND
FUTURE MILITARY ENLISTED PERSONNEL

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THESIS

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and
FUTURE MILITARY ENLISTED PERSONNEL

by

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An Examination of the Quality of Current
and
Future Military Enlisted Personnel

by

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Lieutenant, United States Navy
B.S., United States Naval Academy, 1975

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requirements of the degree of

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ABSTRACT

This thesis was written to synthesize some of the previous work concerning the educational attainment and mental level of enlistees. It addressed quality projections of the future pool of recruits, the Academic Remedial Training (ART) program, the Job Oriented Basic Skills program, reading grade levels of recruits and rate training manuals, and results of interviews conducted with persons who have dealt with personnel quality issues.

The main thrust of this thesis centers around an examination of the present unofficial definition of quality in the Navy (educational attainment and mental ability) and illustrates the need for an expanded definition of quality that would enable the selection criteria for enlistment to be more predictive of future behavior.

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I. INTRODUCTION

The quality of the All-Volunteer Force first-term enlisted has been claimed to be better than that of the first term enlisted under conscription (GAO: FPCD 79-34, pp. 1-2). Others, however, state that the quality of first term enlisteds are the same now as under the draft (GAO: FPCD 79-34, pp. 1-2). Still others contend the quality of the first term enlisted has gone down (GAO: FPCD 79-34, pp. 1-2). This wide range of beliefs concerning the quality of first term enlisted personnel seems improbable, given the fact that quality is defined generally as educational attainment¹ and mental level as indicated by an individual's score on the Armed Services Vocational Aptitude Battery (ASVAB) (America's Volunteers: pg. 24). Yet, the debate persists, involving the executive branch of the federal government including the Department of Defense, as well as Congress and various research institutions (GAO: FPCD 79-34, pg. 2).

With this disagreement about quality as a backdrop, this thesis is devoted to a discussion of personnel quality, particularly the quality of the first-term enlisted sailor. The format to be used is straightforward: examine quality as it is generally defined in terms of educational attainment and mental level, discuss programs aimed at improving

¹Educational attainment is defined to be high school graduation status, years completed and so forth.

quality, and present the views on quality held by persons who have dealt with quality. For convenience, the analysis of quality can be roughly divided into two parts, a supply element and a demand element. The supply side is concerned mainly with the persons who may be available for enlistment in the future. The demand aspect encompasses the Navy's desires for quality. The plan of this thesis is to present information on both by synthesizing work related to each area.

The supply side deals with an explanation of quality as it is now commonly defined; that is, by educational attainment and mental level. Accepting this definition, the thesis next explores quality projections concerning the future pool of enlistees.

The discussion of the demand for quality explores two programs impacting upon the qualities needed in a naval recruit, and presents information on reading demands in the Navy. Lastly, results of interviews with persons who have dealt with personnel quality issues are presented.

This thesis is an effort to bring together some of the facts known about quality, but which are scattered in various papers, studies and articles. The survey style of this thesis should provide the reader with a better understanding of quality. The thesis also demonstrates need for an improved definition of quality.

II. QUALITY DISCUSSION

As noted in the introduction, the definition of quality may be interpreted differently by different parties (GAO: FPCD 79-34, pg. 1). The military primarily judges an individual's quality when enlisting by his or her performance on the Armed Services Vocational Aptitude Battery (ASVAB) and whether or not the individual holds a high school diploma (America's Volunteers: pg. 30).² A table of the different mental categories and high school graduation (HSG) shows in a relative sense how these two characteristics interplay with each other in terms of quality and acceptability for enlistment in the services. (See Appendix A for explanation).

This definition of quality in terms of mental group and High School Graduation Status has recently come under fire. A General Accounting Office report (FPCD-79-34, April 25, 1979) finds fault with the current definition because it leaves out such characteristics as job performance and the individual's behavior while in the service. Additionally, other factors which may be included, but are omitted, include trainability, adaptability to military life and completion of the service members contractual obligation. (Of course these measures are not directly available prior to enlistment). Dr. Jules Borac of the Navy Personnel

²Moral qualifications are not addressed in this thesis.

TABLE 1-1

MENTAL CATEGORIES AND EDUCATIONAL ATTAINMENT

	I	II	III	IV	V
AFQT	93-100	65-92	50-64	31-49	10-30
% TILES	Hi Quality	Hi Quality	A AVG Quality	AVG Quality	Lo Quality
	Hi Quality	Hi Quality	Accept	Accept	Marginally Acceptable
	Acceptable	Acceptable	AVG to Lo Quality	AVG to Lo Quality	Not Acceptable
HSG	Hi Quality	Hi to AVG Quality	AVG Quality	Lo Quality	Unqualified
	Acceptable	Acceptable	Accept	Accept	Not Generally Acceptable
NHSG	Acceptable	Acceptable	Accept	Accept	Not Acceptable

Research and Development Center (NPRDC) in San Diego agrees with the gist of the GAO's argument, adding that in order to determine if an individual is of high quality, the Navy should wait and see if the sailor reenlists. Dr. Borac continues, stating that without the gross numbers of servicemen generated by the draft, a much more refined measure of quality must be formulated (Borac: 14 Sept. 1979).

Indeed, the military definition of quality may be too simplistic, but at present the potential of an enlistee can be measured to a degree (via mental tests and some biographic data such as years of education completed), so at least the probability for his or her completing the first enlistment can be calculated and used in enlistment decision-making. In fact, it has been found that high school graduates tend to attrite at a rate about 50% that of otherwise equivalent non-high school graduates as the following table of Army attrition rates indicates.

TABLE 1-2

	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>
HSG	20%	24%	25%	25%
NHSG	45%	50%	50%	48%

U.S. Army attrition rates for High School Graduates (HSG) versus Non-High School Graduates (NHSG) as a percentage. (e.g. 20% of 1973 HSG recruits attrited).
 Source: Defense Manpower Data Center, Monterey, California.

It is obvious that of the two choices of either using the present system for determining quality or of waiting for the

enlistee to become proficient in his job or reenlists, the former is what must be used during the recruitment process.

Currently, no official DoD definition of quality exists (GAO: FPCD 79-34, pg. 1), and, as stated by a staff paper from the Rand Corporation in 1977 titled "The All Volunteer Force: Five Years Later", "...quality has come to be interpreted in terms of certain measurable attributes possessed by those in or entering the military, such as mental aptitude and educational attainment." The end result of all this is that the services appear guilty, at least to the GAO, of not stating what they are looking for from the population and are unable to substantiate any claim that the present quality measures are the best or most appropriate.

III. FUTURE POPULATION PROBLEMS

One of the more serious problems facing the Navy in the future comes not from the Soviet Union, China or Congress, but from the declining number of youths in the United States. The gross numbers of males available for service will fall approximately 1% below FY 1978 levels by FY 1982, but by FY 1987 the decline will be closer to 15%. This decrease will continue at least until FY 1990 when the percentage will be in the area of 17% of the 17-21 year old males available for enlistment in FY 1978 (America's Volunteers: pp. 53-54). In raw numbers, these percentages show that in FY 1978 nearly 10.8 million males fell into the 17-21 year age group (the usual enlistment window), but within twelve years, that number will decline to less than 9.4 million (America's Volunteers: pp. 53-54).

The declining numbers of future youth obviously reflect a lower birth rate in the late sixties and seventies as compared to earlier "baby boom" days. Comparisons of fertility rates from 1947 through 1973 reflect this drop more emphatically than do sheer numbers. (See Exhibit 1 in the Exhibits section).

A study of fertility rates by William P. Butz and Michael P. Ward for the Department of Health, Education and Welfare uncovered a countercyclical trend in the average number of births per female per lifetime in the United

States (Butz: pg. V). In the past, fertility analysts have believed a positive relationship existed between the economic activity of a developed country and the birth rate of that country. In other words, the better the economic conditions, the higher the birth rate (Butz: pg. V). The work undertaken by Butz and Ward developed an empirical model which attempted to explain the counter-cyclical trend in birthrates observed in the U. S. after the early sixties. The end result of their work shows economic activity does influence birth rate, but the male's annual earnings may not be sufficient to explain fertility trends.

...an increase in husband's market wages raises family income and leads to an increased demand for children as well as other things. An increase in wife's wage also increases family income but, in addition, raises the cost of children since the opportunity cost of childbearing and rearing rises at the same time. For families in which the wife is employed, increases in her wage raise the cost of children. For families in which the wife is not employed, wage changes do not affect fertility unless they induce her to enter the work force. The positive effect of changes in husband's income on fertility is expected to be less in families with nonemployed wives. (Butz: pg. V).

Butz and Ward continue their analysis of fertility by quoting several proponents of the belief that a new economic boom would increase birth rates, and responding to these claims, state:

In our view, the only conceivable changes that could produce the level of increasing fertility that these authors expect are a large fall in young women's unemployment, which would restore the traditional positive relationship between aggregate economic conditions and fertility, or a substantial increase in the supply of preschool or day care facilities... The first is very unlikely (Butz: pg. 34).

The impact of Butz and Ward's statements on the Navy, if their model is accurate and their findings correct, could mean an even smaller pool of eligible males in the 1990's because it would require a drastic change in the employment of women. The authors seem to be correct in their assumption that such a change is unlikely, because projections indicate an increase in the employment of women in the eighties. In fact, the participation rate for women in the labor force is predicted to increase by 15% between the present and FY 1990 (America's Volunteers: pg. 55). The Navy itself is increasing the number of women in the service to help offset the declining accessions (witness the recent move of allowing women to serve on a limited number of ships) (Sinaiko: pg. 4).

The projections made earlier in this section regarding the eligible pool of possible enlistees (ages 17-21) can be considered fairly accurate, since to be eligible for enlistment in 1990, one would have to have been born not later than 1973, and the numbers of births are, of course, known (Grissmer: pg. 8). However, projecting even further into the future, a declining pool is projected until somewhere past 1995. A study funded by the Navy, and completed by MATHTEC, attempted to make projections until the year 2000. Three different scenarios were analyzed in regards to birth rates, using 2.7, 2.1, and 1.7 lifetime births per female. Relying on the beliefs of Butz and Ward that the birth rate will not increase and the fact that the rate for 1976 and 1977 was about 1.8 (Grissmer: pg. 3), the

graph of the "pessimistic" scenario presented by MATHTEC is perhaps most applicable (See Exhibit 2).

An interpretation of this graph shows the total supply of the 17-21 year age group will decrease for almost twenty years with declines approaching 30% of the 1979-1980 totals. The problem of aggregate totals is decidedly not short term, and any changes undertaken to aid the Navy must be considered over the long term.

The enlistment model* presented by R.V.L. Cooper in his report on the AVF, Military Manpower in the All-Volunteer Force, includes other factors besides manpower availability, factors not directly under the control of the Department of Defense such as civilian unemployment and relative civilian wages. Both of these variables will affect the Navy and its recruiting efforts in the context of the aforementioned shrinking 17-21 year old cohort. Since the Navy is not the only employer of the 17-21 age group, it is important to look at the market position of this age group vis a vis civilian industry, because their other employment opportunities in turn affect the number of enlistments.

During the years of increased numbers of youth, the unemployment figures for this cohort, other factors being

*Cooper states that the individual's decision to enlist is a function of at least the following variables: military wages, other tangible aspects of military employment, recruiting effort, wages from civilian employment, civilian unemployment, taste for military service, and the relevant population base. Military Manpower in the All Volunteer Force, Rand Corp. R-1450-ARPA, Sept. 1977, pg. 160.

equal, also increase. The relative wages for this group then decrease as well, causing military service to be even more appealing (Wachter: pg. 7). Recent work completed by Dr. Lawrence Goldberg of the Center for Naval Analysis explored the effect of advertising in an enlistment equation. His research lead him to consider youth unemployment. Dr. Goldberg summarized that a one percent change in youth unemployment translates to a 1700 person change per month (all with high school degrees) in the number of enlistments for the Navy, other factors being equal (Goldberg: 11 Sept. 1979). The impact of such a change cannot be minimized. With a smaller labor force coming into the labor market, the supply and demand conditions will favor both higher employment and higher relative wages. Thus, fewer youths should desire to enlist in the military (Goldberg: 11 Sept. 1979). Projections for lower unemployment and a lower birth rate show the considerable impact of both on mental category I and II high school enlistments, usually judged to be the most sought after high quality accessions (see Exhibit 3). As illustrated by Exhibit 3, as early as 1985, a 20% decrease in enlistments of these highly prized individuals may be anticipated as compared to FY 1976 with a decrease of almost 40% by the mid 1990's.

As if the above projections are not dismal enough, the number of lesser qualified youths willing to enlist may also experience a decline greater than the population drop. Skilled jobs normally considered unattractive, will probably

have their wages increased in order to fill labor needs (Wachter: pg. 8). Lower skilled jobs should experience the same phenomenon, because of employers' needs to achieve an adequate labor force (Wachter: pg. 8).

The end result of the smaller 17-21 year old cohort, lower employment and higher wages will be that the recruiting effort will be even more difficult. Predictions indicate, unless special steps are taken, a large drop in the number of mental category I and II high school graduate enlistments (from the 36% of total DoD accessions in 1975 as noted in Exhibit 5) until at least 1995 and as civilian wages for skilled but unattractive jobs increase, the lesser qualified youths in terms of mental categories III and IV may opt for the services in smaller numbers than needed. Maintaining the needed level of manpower in the Navy will be a most intriguing problem.

IV. HIGH SCHOOL GRADUATES

An individual has a better chance of being considered qualified for enlistment in any of the armed services if he or she is a high school graduate than if the individual is not a high school graduate. The Services' preference for high school graduates is manifested in Exhibit 4, which shows the percentage of total active duty non-prior service enlisted accessions from FY 1964 through FY 1977. The number of accessions during these years who have graduated from high school represent well over fifty percent of total accessions for all services (and for DoD as whole, this percentage runs from well over 60% to 75%). The military in general is trying very hard to attract high school graduates. The rationale behind such emphasis is explained by the fact that a high school graduate is less likely than a non-high school graduate to attrite before completion of his or her initial obligation. Several studies have been conducted which support this statement. When comparing high school graduates and those who did not complete high school, the holding of a diploma is the single best predictor of completion of the enlistment term (GAO: FPCD 79-34, pp. 9-10).

As stated earlier in this thesis, the number of persons in the age group usually considered available for military service will decline. However, the percentage of those in the target population with a high school degree will not decline. In fact, projections into 1985 indicate a slight

increase in this percentage when compared to 1975 data (Frankel: pg. 28). As data in the following table indicate, by 1985 the absolute number of new high school graduates will closely reflect the numbers of 1965. However, the percentage of high school graduates is projected to be about 76% of the total population of 18 year olds in 1985, rather than the 75% of 1965 (Frankel: pg. 28).

TABLE 3-1

HIGH SCHOOL GRADUATES, BY SEX:
UNITED STATES, 1964-65 to 1985-86
(In Thousands)

YEAR	TOTAL HIGH SCHOOL GRADUATES	SEX	BOYS	GIRLS
1964-65.....	2,665		1,314	1,351
1965-66.....	2,632		1,308	1,325
1966-67.....	2,679		1,332	1,348
1967-68.....	2,702		1,341	1,360
1968-69.....	2,829		1,402	1,427
1969-70.....	2,896		1,433	1,463
1970-71.....	2,943		1,456	1,487
1971-72.....	3,006		1,490	1,516
1972-73.....	3,039		1,501	1,538
1973-74.....	3,077		1,513	1,564
1974-75.....	3,140		1,541	1,599
1975-76.....	3,135		1,543	1,592
PROJECTED				
1976-77.....	3,132		1,541	1,591
1977-78.....	3,143		1,547	1,596
1978-79.....	3,127		1,540	1,587
1979-80.....	3,080		1,517	1,563
1980-81.....	3,030		1,493	1,537
1981-82.....	2,941		1,448	1,493
1982-83.....	2,821		1,389	1,432
1983-84.....	2,727		1,343	1,384
1984-85.....	2,679		1,320	1,359
1985-86.....	2,681		1,321	1,360

Source: Projections of Education Statistics To 1985-86 by Martin M. Frankel and Forrest W. Harrison, National Center for Education Statistics, 1977, pg. 32.

The grim outlook for future accessions may be brightened somewhat by the prospects of having a percentage point more of the target population with high school diplomas, but the absolute number of high school graduates will continue to show a declining trend. Additionally, the number of high school graduates who may be recruited may be reduced even more because of the attraction of post secondary education.

Reflecting once again on projections made by the National Center of Education Statistics (Frankel: pg. 33), the number of persons who are predicted to graduate from college with a bachelor degree in 1985-86 will be 953,000, an increase of over 47% of those in 1964-65 when 501,248 baccalaureate degrees were granted. Using a four year period as the time needed for most students to complete the requirements of a bachelor's degree, it can be noted that in 1964-65, 2.665 million students received high school degrees. Four years later in 1968-69, .728 million received bachelor's degrees. In order to graduate from college in 1985-86, high school graduation would, in the typical case, occur in 1981-82, when projections show 2.941 million high school diplomas being awarded. In short, looking at 1964-65 high school graduate numbers, and comparing these figures to 1981-82 projections, one sees an 11% increase in high school graduates from 1965 to 1982. But, when comparing the number of 1964-65 persons who receive a bachelor's degree in 1968-69 to those projected

in 1985-86, a 23% difference in high school graduates will graduate from college*. The above analysis is tenuous, but the importance is not in the exact numbers; rather in recognizing the growing attraction of college for high school graduates. The 1964-65 high school graduation population closely approximates numerically the population of high school graduates in 1985-86. Yet, unless some drastic change occurs which reduces the attraction of college, a larger percentage of HSDG's will go on to college thus reducing the enlistment pool (although the officer pool may not be as affected). In fact, a study funded to analyze the decline of Scholastic Aptitude test score decline notes an increase of college-bound high school seniors by almost 50% in eighteen years (from about one fourth in 1952 to half in 1970) (Wirtz: pg. 13). Additionally, the study found obtaining admission to a college is becoming easier, and an increase in remedial programs at the college level enables the institutions of high learning to more easily handle the less gifted student (Wirtz: pg. 19). Future high school graduates may find themselves in a situation somewhat akin to that of the Organization of Petroleum Exporting Countries (OPEC) in that both will control a limited resource which will be in demand by multiple consumers.

*The 23% figure was arrived at by dividing the number of college graduates by the number of high school graduates four years previously. For example, the numbers of 1969 college graduates divided by the numbers of 1965 high school graduates.

Colleges can be considered as a competing industry for the military because colleges require high school graduate input. With this in mind, and the given prospect of a declining pool of possible students, it can be expected that the college system will be trying to attract at least as many students as now. Thus, it may not be unrealistic to estimate that 50% of high school graduates will go on to some form of continuing education (4 year college, 2 year junior college or vocational school) rather than enlisting. College enrolled 17-21 year olds are factored out of the analysis used to determine the number of persons in the prime market for recruiting or the pool of eligible enlistees (America's Volunteers: pg. 31). But, the attraction of college has increased, as noted previously, and if such a trend should continue, the number of high school graduates in the pool of eligible enlistees may decline even more than present projections.

V. MENTAL APTITUDE

Quality, as noted previously, is defined by educational attainment and mental aptitude. Mental aptitude is determined from scores on the Armed Services Vocational Aptitude Battery (ASVAB). Some of the ASVAB scores are translated into an Armed Forces Qualification Test (AFQT) percentile ranking* that determines which of the five mental categories the individual falls into (America's Volunteers: pg. 15). The range of the test scores for each mental category are: 0-9 category V, 10-30 category IV, 31-49 mental category III (lower), 50-64 mental category III (upper), 65-92 mental category II, 93-100 mental category I (America's Volunteers: pg. 25). By law, category V individuals are not allowed to serve in the military (Karpinos: pg. 5). (The distribution of the mental categories of accessions by service from 1964 to 1977 is provided in Exhibit 5).

The ASVAB is the most recent armed forces test of mental capabilities. Military mental testing dates back to the Alpha and Beta mental tests of World War I and the Army General Classification Test (AGCT) of World War II (Karpinos: pg. 2). In 1948, the various branches of the military jointly designed a common test for all the services which

*AFQT percentile rankings are computed from the Work Knowledge (WK), Arithmetic Reasoning (AR) and Space Perception (SP) tests of the ASVAB. The raw scores are added together and converted to AFQT scores using a conversion table (Navy Recruiting Manual - Enlisted pg. 9-12)

was intended to: provide a measure of mental ability, contain items common to all the services' past classification tests such as vocabulary and arithmetic reasoning, minimize the importance of speed, and lastly, minimize the difficulty of verbal instructions relating to test items (Karpinos: pg. 2). The final product of this joint effort was the Armed Forces Qualification Test (AFQT) and Congressional direction which dictated the services cannot enlist any mental category V individual (Karpinos: pp.1-5). As noted previously in this thesis, the AFQT was subsequently represented in the ASVAB with a certain number of test items representative of the AFQT. In this manner, the ASVAB scores can be used to determine AFQT mental categories for enlistees. It is important to note that the mental categories constructed from the AFQT are standardized with the AGCT which was standardized on the mobilization population of 1944 (Karpinos: pg. 4). (Although this standardization enables analysis of AFQT scores over time, some concern has been expressed as to whether the enlistable portion of the present population is comparable to the mobilization population of 1944, or have factors influenced the present enlistable cohort which may make it different from its 1944 counterpart (Karpinos: pg. 4).)

Scores on the ASVAB are used in part to determine what types of military jobs an individual may be qualified to fill. Since the testing procedure is of the pencil and paper variety, an individual must have reading and

arithmetic skills to answer the questions. In fact, Dr. Bill Sims of the Marine Corp Occupational Analysis Group (MCOAG) reported that the ASVAB correlates highly with reading tests designed to determine reading grade level (Sims: 11 Sept. 1979). The correlations between the various reading grade level (RGL) tests and the AFQT range from .68 to .79 (Stricht: pg. 14). In other words, the test used by the services to determine the mental category of an individual is a rather good predictor of that person's reading ability.

It is possible to look at some leading indicators of mental categories if one considers literacy (reading grade level) and results of tests such as the Scholastic Aptitude Test (SAT) as proxies for the ASVAB in defining these categories. Reading grade level scores and the SAT scores both may be useful as leading indicators of the quality available in the recruitable population.

A. LITERACY

As noted in the preceding paragraphs, the AFQT can probably serve as a fairly valid indicator of reading grade level. Therefore, examining how students are faring at present in regards to reading skills can probably help one to predict gross trends in ASVAB scores. (It must be remembered throughout the following discussion on literacy that no commonly accepted definition for literacy exists (Fisher: pg. 4).)

Examinations of student literacy by the National Assessment of Educational Progress (NAEP) were not started until 1971. (NAEP is a division of the Office of Education of HEW which through the National Institute of Education funds the National Assessment of Educational Progress, which in turn administers the basic skills tests and tabulates the results). The examinations were initiated in response to criticisms that the educational system in the United States was graduating high school students who did not have basic competence in reading, writing and arithmetic (Reading in America: pg. 1). Although other indices of student abilities such as the SAT, ACT and Iowa Standard Test have been used to collect data over a number of years, (America's Volunteers: pg. 15), the NAEP is specifically designed to survey the educational attainments of 9, 13, and 17 year olds, as well as the 26-35 year age group. The NAEP's tests are administered to a large sample (N=2500) representing a cross section of the 9, 13, and 17 year olds throughout the United States (Reading in America: pg. vii).

As was mentioned, the first NAEP data are from 1971. Another survey of reading was conducted in 1974-75 for the same groups as in 1971, i.e. 9, 13, and 17 year olds (as explained to this author in telephone conversations with NAEP administrators in Denver, Colorado, the likelihood of a 9 year old being tested in 1971 and subsequently retested as a 13 year old in 1975 were infinitesimally small). Comparisons of these surveys produced somewhat encouraging

results. In brief, 9 year olds did significantly better in 1975 in reading than 1971's 9 year olds. Black 9 year olds improved even more markedly than 9 year olds as a whole. No significant improvement was noted for 13 and 17 year olds between 1971 and 1975, and girls continued to read better than boys overall (Reading in America: pg. xi).

The impact of NAEP's findings on the Navy would seem to indicate no real change in the literacy level of the target population of future accessions in the near future. However, some change in the ASVAB test scores may become noticeable in 1984 (the year some of those 9 year olds tested in 1975 would be 18 years old and taking the ASVAB). Thus, any increased marks in the NAEP literacy tests could bring about better ASVAB scores which could mean more persons falling in mental categories I-III once those individuals reach the enlistment window.

Functional literacy assessment is an offshoot of the NAEP literacy testing. It does not measure reading grade level attainment, nor is it designed to test knowledge of math or history. Rather, functional literacy assessment is used by the NAEP to determine whether an individual has sufficient mental skills to function in society (Functional Literacy: pg. ix). The questions on the functional literacy test were picked with the intent that all 17 year olds could conceivably answer all correctly. Any person scoring below 75% correct on the test was not considered to be functionally literate (Functional Literacy: pg. 5). An example

of six questions from the test illustrates that to a certain extent vocabulary enters into the test, but for the most part, the questions are designed to require an individual to use skills needed in everyday life such as using an alphabetical listing or reading a map (See Appendix B).

As with the NAEP's literacy tests, the Mini-Assessment of Functional Literacy (MAFL) was administered to a sample of 17 year olds in 1971, 1974, and 1975. No younger children were tested because the assessment was designed to see what percentage of the end products of public schooling were functionally illiterate (Functional Literacy: pg. vii). The results of the MAFL showed the seventeen year olds of 1975 improved in their ability to cope with daily information as compared to the seventeen year olds on 1971. (see Exhibit 6).

As this author interprets the data in Exhibit 6, it would appear the population of 17 year olds in 1975 may not be reading appreciably better than their 1971 counterparts, but at least are receiving and using information more correctly on the whole. Once again, the results could be surmised as having a potentially positive effect on the Navy. As long as seventeen year olds continue to improve in using everyday information, the greater the probability that the Navy will obtain recruits who can at least cope with basic organizational and safety information. Surprisingly, it is in rare cases possible to be functionally illiterate and still be a manager or a professional. Three different

studies of functional literacy were conducted among persons considered to be in the professional-managerial level of their occupations. All three studies reported some managers to be functionally illiterate with percentages ranging from five to fourteen percent of the tested managers scoring low enough on the test to be considered functionally illiterate (Fisher: pg. 5).

In conclusion, predictions concerning literacy can only be speculations based upon trend data. Some positive trends can be discerned from the results of the literacy testing conducted by the National Assessment of Education Progress. Improvement in reading was noted in 9 year olds in 1975 when compared with 9 year olds in 1971. This may indicate a stronger foundation in the basic skill of reading which may foretell a future cohort of 17-21 year olds able to read better than earlier cohorts. Improvement in functional literacy test scores for 17 year olds in 1975 was compared to 17 year olds in 1971 and 1974, may indicate an increase in the number of recruits who can cope with basic organizational and safety information. The importance of these gross indices of literacy becomes more recognizable when one considers the reading burden placed on the enlisted man in the Navy. (See section 5 of this thesis for a discussion of the reading demands in the Navy).

B. SAT

The Scholastic Aptitude Test (SAT) is perhaps one of the best known national examinations administered to students.

Since it is used primarily by college-bound high school seniors, scores made on the SAT have taken on an aura of authority by which the educational system in the United States is judged as to how it is performing its task of educating children. Primarily of interest here is the use of the SAT as an unchanging indicator of how today's high school seniors compare to those of past years. The appropriateness of viewing the SAT as a possible index of the quality of future accessions into the Navy may be questioned; however, this need not be the case since many factors which may be influencing SAT test-takers should also affect those who do not take the exam.

Recent headlines read "College Board Scores Drop Again in the U. S." (Monterey Peninsula Herald: 9 Sept. 1979, pg. 1). According to the article, SAT scores have dropped to 427 on the verbal section and 467 on the mathematics section with a score of 500 out of a possible 800 on each section originally considered average. The decline in test scores is not limited to one year, but has been observed in varying degrees since 1963. (See Appendix C-1 for SAT Test Score Table). A study conducted from 1975 to 1977 by the College Entrance Examination Board addressed many of the possible factors influencing the SAT score decline (Wirtz: pp. 46-48). The study checked norming methods used by the developers of the SAT and found norming discrepancies (Breland: pg. 6). However, the findings showed test scores should have risen as a result of the norming error and not declined. An analysis of the test taking population

provided some explanation for the decline, because the make up of the test taking group had changed. Starting in 1964, the number of students taking the SAT increased greatly and the percentage of high school juniors and seniors taking the test increased. This increase, coupled with students staying in school for more years, and an increased awareness of equality in education, played a major role in the decline, because more students with varied backgrounds were taking the test than prior to the 1960's (i.e. more students from families with lower incomes, etc.). However, this effect should have diminished by 1970 when the absolute numbers taking the test began to decline. Best estimates are that the compositional change of the test-taking population explains two-thirds to three-fourths of the SAT score decline (Wirtz: pp. 13-18). The remaining fraction of the decline continues to plague those who attempt to explain the SAT averages. The study noted several probable drivers of the remaining decline. In summary, these influences are thought to include:

1. Schools placing reduced emphasis on steady growth of verbal and mathematical competence.
2. Diminished seriousness of purpose and attention to mastery of skills and knowledge in the learning process as it proceeds in the schools, the home, and the society in general.
3. Particularly because of television, most children's learning now develops through viewing and listening rather than through more traditional methods.
4. The rapidly increasing number and percentage of children in less than complete families.
5. Between 1972 and 1975, the disruption in the life of the country.

6. A marked diminution in young people's learning motivation (Wirtz: pp. 46-48).

The Navy must have been adversely influenced by many of the above factors, because these factors are probably at work throughout the 17-21 year old population. The two most striking findings of the study to this author were the diminished attention to skill mastery, and the lack of motivation to learn as noted by the study's investigators (Wirtz: pg. 48). It is tempting to try to link these factors to attrition figures and other personnel problems throughout the services.

The SAT score decline meshes with the findings of the NAEP literacy investigations. The reading abilities of 17 year olds in 1971 remained virtually unchanged in comparison to 17 year olds in 1975. Additionally, since the 13 year olds of 1975 exhibited no discernable difference from their counterparts in literacy testing in 1971, it might be expected that the SAT scores of the 1979 test takers would not be any better than in 1975 - in fact they were lower. (See Appendix C).

The application of literacy testing results and the decline of SAT scores to the present enlistable portion of the population would seem to indicate at best the present population should not be much different from the population of the last few years, at least in regards to mental test scores. And surely, the more intelligent and better scoring members of the enlistable cohort in the future will find more opportunities because of the decline in the number

of youth, thus probably reducing the number of the high quality youths who will consider military service. Nevertheless, it is impossible to speculate with any degree of accuracy on how good the mental capabilities of future enlistees will be. At best, one can say the potential of improvement over today's recruit is possible since it appears from the NAEP literacy research that 9 year olds in 1975 may be receiving a better foundation in fundamentals than 9 year olds did in 1971.

(An interesting sidelight was noted by this investigation while researching the SAT. It seems absenteeism in high schools has been on the increase since the late 1960's, with rates of 15 percent becoming common, and 20 to 25 percent not unusual. (Advisory Panel: pg. 29). Casual correlation with Non Judicial Punishment (NJP) rates over time shows that in the late sixties, NJP rates began to climb (America's Volunteers: pp. 47-50). (Absenteeism in the military is reported under the heading of unauthorized absence which, if less than thirty days, is usually handled by NJP). A look at the statistics for the Navy's NJP incidents per 1,000 sailors from the late sixties shows the rates hover around 11-12 percent from 1968 until 1972 when rates begin to climb to over 10 percent (1974), leveling out at 16% in 1977 (America's Volunteers: pg. 49). In other words, the statistics where absenteeism would appear in the Navy, namely NJP incidents, reflect an increase at approximately the same time high school absentee rates increased).

VI. ACADEMIC REMEDIAL TRAINING, READING, JOB ORIENTED BASIC SKILLS, AND IMPROVING QUALITY

As noted earlier in this thesis, the number of male youths available for the military will decline until the mid 1990's. In absolute numbers the enlistable cohort will decrease, while the percentage of those in the cohort holding a high school diploma will increase slightly. Being faced with these prospects, several alternatives have been put forth which may relieve the impact of the decline on military recruiting. Dr. John White, former Assistant Secretary of Defense (Manpower Reserve Affairs and Logistics), provided in Congressional testimony the following list of alternatives: 1. Reduce first term attrition (thus reducing the additional input needed to replace those who leave before the end of their obligation); 2. Utilize more women (thereby reducing the number of males required); 3. Substitute more civilians in some jobs now being performed by those in the service; 4. Increase the ratio of career to first term service members (which will decrease the demand for new recruits and create an older force in terms of average age); 5. Increase the initial enlistment term (Congressional Budget Office: pg. 19). R.V.L. Cooper in his work Military Manpower in the All-Volunteer Force discusses these same ideas. Another possible alternative involves adjusting other factors of demand by changing the skills the Navy requires of its enlisted personnel or by changing the basic skill levels of Navy personnel.

A. ART AND THE IMPACT OF READING ON THE NAVY

Academic Remedial Training is a program designed to increase the individual recruit's reading grade level.* The enlistee must have between a fourth grade and a sixth grade reading level to qualify. The program is taught during basic training and can take up four weeks. If a sailor fails to increase his or her reading grade level (RGL) past the sixth reading grade level, he or she is released from any further enlistment obligation (Corkins: 1 Aug. 1979). In FY 1979, 2,187 recruits successfully raised their RGL's to enable them to continue their enlistment. Two hundred and eighty-one did not improve their reading ability to a sufficient level and were released from service (Corkins: 26 Nov. 1979). The ART program is used at all Navy Recruit Training Centers (San Diego, California, Orlando, Florida, and Great Lakes, Illinois). In the past, instructors were used to teach the enlistees in need of remedial training (Zierdt: pg. 48), but a new method currently being tested involves the use of computer assisted instruction. It has been claimed this method will enable twenty-four students to be handled by a single instructor instead of the present ratio of one instructor to twelve students (Corkins: 1 Aug. 1979).

*A reading grade level (RGL) score refers to that grade level in school at which one would expect students to obtain a particular raw score. Thus, a 6-0 RGL means the ability of the average student beginning the sixth grade (Duffy and Nugent: pg. 5).

The need for sailors to have a solid base in reading skills is neither new nor can it be overemphasized. As early as the first half of the nineteenth century, the Navy provided reading assistance for those in the service. The "job description" for a Navy Chaplain in 1802 required him to "...perform the duty of a schoolmaster; and ... he shall instruct the midshipmen and volunteers in writing, arithmetic and navigation..." (Fletcher: pg. 6). World War II manpower shortages caused a more organized approach to remedial reading programs in the Navy because of the marginal literacy skills held by a greater number of recruits (Fletcher: pg. 11, Zierdt: pg. 42). Literacy improvement programs continued in the Armed Services through the periods of both the Korean War and Vietnam. In fact, one of the more well-known literacy efforts occurred during the Vietnam years with Project 100,000. The aim of this DoD project was to admit 100,000 men who would have been disqualified for service because of low mental aptitude or, in a select few, failing to meet physical standards (Zierdt: pp. 42-43).

The need for a solid base in reading skills is best illustrated by an incident recently occurring on a Naval ship. As related by Admiral James D. Watkins, when he was Chief of Naval Personnel:

Recently, on one of our ships, an engineman was rebuild-a diesel engine as part of a routine maintenance schedule. He could not read well. So he went about accomplishing the process by looking at the pictures in a technical manual. When he tried to install the cylinder liners, there was no picture. So he installed them the way he

thought they should be. The result was he installed them upside down. It cost \$250,000 to repair the engine. (Frederiksten: pg. 25)

As noted in the initial part of this discussion on reading, one measure used to determine reading ability is by calculating an individual's reading grade level (RGL). A study of recruits was conducted by the Naval Personnel Research and Development Center in San Diego, California, using the Gates-MacGinite test (Duffy: pg. 5). The data obtained in this survey of reading grade levels completed in April 1978 are fairly representative of the percentage of new recruits at a given reading level for all new enlistees through the summer of 1979 (Corkins: 1 Aug. 1979).* Exhibits 7 and 8 show how the reading grade levels of new recruits are distributed by high school graduation status and mental group.

The importance of knowing how well recruits can read becomes relevant when one analyzes the difficulty of the reading materials encountered by sailors during the course of their enlistments. The following chart provides a sample of the RGL's of some of the tests and manuals used in the Navy. The figures provided include the total sample size examined (N) and the percentage of those whose tested

*This is based on the fact that no real change occurred in entrance mental qualifications for the Navy until July 1979. At that time the "Parity Program" pursued by the Navy was eliminated and the percentage goal for high school graduate recruits was reduced from 76% of all new recruits to 72%. The Parity Program" was designed to reduce the possibility of having larger percentages of minorities in a few ratings and a very small number of others (Aiken: 14 Sept. 1979).

reading grade levels were below the sixth RGL and the tenth RGL. The manuals tested for the ratings listed are used for third and second class petty officers rate training manuals.

TABLE 5-1

READING GRADE LEVELS (RGL) FOR SELECTED RATE TRAINING MANUALS AND RECRUITS ASSIGNED TO THOSE RATES

RATING	MANUAL* RGL	% LESS THAN 6.0 RGL	% LESS THAN 10.0 RGL	N
Quartermaster	10.9	1.2	7.1	255
Signalman	11.5	2.5	18.5	119
Sonar Technician (Surface)	12.7	1.1	5.9	185
Gunner's Mate Gun	11.0	0.0	17.4	132
Missile Technician	14.1	0.0	4.4	135
Electronic Technician Communication	12.9	0.4	5.2	445
Radioman	12.6	0.7	19.8	722
Yoeman	13.5	0.5	13.4	187
Mess Specialist	11.0	6.5	42.9	571
Ship's Serviceman	12.9	6.1	49.5	277
Engineman	11.2	2.8	27.3	532
Boiler Technician	11.8	3.6	36.7	749
Construction Mechanic	10.4	2.7	31.0	113

*Manual RGL's determined by a readability index normed on Navy men and materials.

(Source: Reading Skill Levels in the Navy by Thomas M. Duffy and William A. Nugent, Naval Personnel Research and Development Center, San Diego, California, NPRDC TR 78-19, April 1978).

Although the table deals exclusively with rate training manuals for those aspiring to third and second class petty officer, the level of reading ability required for new recruits by The Bluejackets Manual, the basic manual for boot camp, is 11.5 (Duffy: pg. 34). In fact, the rate training manual for Disbursing Clerk First Class and Chief Petty Officer has a readability level of 16.26 (Curran: pg. 73). An examination of 185 rate training manuals for readability using the Kincaid formula showed a range of RGL's from 8.82 to over 16 with the median being 12.6 (Curran: pg. 73). When this median is compared with the RGL's of new recruits, the possibility of having reading problems such as experienced by the engineman who caused \$250,000 worth of damage seems real. The following table provides data relating mental group to reading grade level.

TABLE 5-2

CUMULATIVE PERCENTAGE DISTRIBUTION OF READING GRADE LEVEL (RGL) SCORES FOR MEN IN EACH MENTAL GROUP OF A SAMPLE OF 29,778 RECRUITS

Mental Group	N	Median RGL	READING GRADE LEVEL			
			4.0	6.0	8.0	10.0
I	1,046	11.7	0.4	0.5	1.1	3.7
II	10,810	11.4	0.4	0.8	2.1	8.0
Upper III	9,574	10.5	1.3	6.5	18.0	39.8
Lower III	7,010	9.1	4.8	15.9	34.4	64.4
Upper IV	1,338	7.6	8.8	27.3	55.6	83.2

Source: Reading Skill Levels in the Navy by Thomas M. Duffy and William A. Nugent, Naval Personnel Research and Development center, San Diego, California, NPRDC TR 78-19, April 1978, pg. 8

The sample of 29,778 recruits included about 39 mental category I enlistees who had an RGL of less than 10.0 (3.7% x 1,046), 865 mental category II enlistees with an RGL of less than 10.0, and 3,810 mental category III (upper), 4,514 mental category III (lower) and 1,113 mental category IV, all with less than a 10.0 RGL. In other words, out of 29,778 recruits tested, 10,341 had RGL's two and a half less than the median RGL (12.6) of the Navy's rate training manuals.

The requirement for reading in the Navy is not limited to rate training manuals. The modernization of systems and high technology in new equipment in use throughout the Navy have expanded the reading requirements for sailors. In 25 years, the number of pages of documentation needed to support a naval aircraft has increased from 2,000 to an estimated 260,000 pages, or over 130 times. All in all, estimates of the number of pages of information needed to operate and maintain present Navy systems are that over 70 million pages are in print (Duffy and Nugent: pg. 1).

In addition to potential problems involving damage to equipment, another offshoot of enlisting individuals who have low RGL's is that they tend to attrite at higher rates than better readers (GAO: FPCD 77-13, pg. 7) In fact, these higher attrition rates are given as at least one rationale for remedial reading programs such as ART (GAO: FPCD 77-13, pg. 8). (GAO did not control for mental group or educational attainment).

As noted in the initial pages of this section, the ART program is designed to help some of the poorer readers who enlist. In an attempt to bring the RGL's of the sailors and the manuals they read closer together, the Navy is attempting to lower the RGL's of the manuals. Under the auspices of the Training, Analysis, and Evaluation Group (TAEG), technical and rate training manuals are being edited utilizing the Kincaid readability formula (Corkins: 1 Aug. 1979).

Readability is a relatively easy characteristic to measure about text in manuals. In order to establish an RGL for a manual, one has to apply a readability formula and a RGL can be computed (Curran: pp. 72,74). However, RGL is only a part of the "formula" which determines how well the information will be received. The comprehensibility of the material (clarity and logical flow of ideas) and the state of the reader play major roles in information gathering (Curran: pg. 73). Needless to say, it is impossible to dictate the reader's emotional and motivational state and it is not certain how much experience and background each will have. However, it is possible to deal with the comprehensibility of written material. The format and organization of information as well as isolation of critical data can make the written word easier to read and understand without appreciably changing the RGL of the text (Aiken: 14 Sept. 1979). The difficulty encountered in trying to improve comprehensibility is that no formula exists which enables one to index comprehensibility

(Curran: pg. 73). Better comprehensible writing requires a good writer with a talent for organization and logical formatting of information (Aiken: 14 Sept. 1979).

Another shortcoming of focusing on the reading grade level of manuals is the basis on which RGL's are established - and reported (Aiken: 14 Sept. 1979). A seventh grade student's main task is to read and comprehend history, math, english, etc. However, in the Navy, enlistees are faced with much more specialized reading requirements. Thus, a small amount of experience can create a highly complex vocabulary for the sailor in his or her area of expertise (Aiken: 14 Sept. 1979).

In summary, reading ability is an area of long standing concern for services. Current data indicate the reading grade levels of a sizable portion of enlistees fall well below the RGL of the material with which they must deal. Efforts to reduce this disparity between the RGL's of recruits and sailors and the publications they utilize in the course of their enlistment have been to provide remedial reading assistance through programs such as the Academic Remedial Training (ART) program, and to lower the RGL's of the manuals in use. However, the emphasis on the latter, though necessary, may not be sufficient, because comprehensibility, although difficult to measure, figures prominently in how well the information in the manual is communicated. Attention must be given to reading skills and demands, because the growth in job-related printed material is staggering. Additionally, in order to maintain an

effective force in the future with the decline in numbers of people in the 16-24 year old cohort, the persons the Navy will be able to attract must be utilized as effectively as possible.

B. JOBS

Job Oriented Basic Skills (JOBS) is a program designed "...to develop the specific skills and knowledge prerequisite to particular Navy technical training courses" (JOBS Project Plan: pg. 4). As the Academic Remediation Training (ART) is designed to improve the quality of recruits who experience serious reading problems, JOBS is an attempt by the Navy to improve the quality of enlistees by providing some basic skills training in a concentrated area to recruits (initially) who otherwise would be ineligible for formal "A" school training (Aiken: 14 Sept. 1979). One major difference between ART and JOBS is in the intended impact on ASVAB scores and reading grade levels. ART is specifically designed to raise the enlistee's RGL and possibly his or her ASVAB score (Corkins: 1 Aug. 1979). JOBS does not attempt to improve RGL of ASVAB scores, although some improvement may be seen in the RGL and ASVAB of an enlistee upon completion of the JOBS curriculum (Aiken: 14 Sept. 1979).

JOBS is a relatively new program having its first input on July 30, 1979 in a Propulsion Engineering curriculum. The remaining schedule calls for commencement of an Operations curriculum on 26 November 1979, an Administrative-

Clerical curriculum on 7 January 1980, and an Electronics curriculum on 18 February 1980 (JOBS Project Plan: pg. 5). The relative newness of the JOBS program precludes any evaluation of its impact.

Eventually, the JOBS program will not draw upon recruits during basic training as it now does.

Under the JOBS concept, lower-aptitude or school-ineligible personnel desiring technical training would be given the opportunity to voluntarily participate in a specialized training program that would provide them with the prerequisite basic skills and knowledge required to successfully complete an "A" school. These personnel would be selected during recruit training, serve a period of time in the Fleet as a member of the general detail (GENDET) force, attend the JOBS school, attend the follow-on "A" school, and return to the Fleet as a designated striker. Since receiving orders to JOBS and "A" school is contingent on successful performance as a GENDET, this procedure is expected to create an incentive to "stick it out" as a GENDET, thereby lowering the high GENDET attrition rate currently experienced (JOBS Project Plan: pg. 1).

The JOBS program has enormous potential for a variety of reasons. If successful, JOBS could relieve some of the recruiting pressure to enlist relatively scarce individuals, such as those of mental groups I and II who are high school graduates, because more sailors once considered ineligible for technical schools would be selected for these schools. Also, recruiters should be able to attract more persons since the opportunity to learn a skill will be increased. JOBS could improve the productivity of the force because more GENDET's will have a reason to perform at their best, namely to insure enrollment in JOBS. And as stated in the JOBS program plan, GENDET attrition rates may fall as well. JOBS should also help minorities because JOBS can open

technical ratings to a greater percentage of them (Aiken: 14 Sept. 1979). Lastly, JOBS is designed to make the once marginal sailor (one who does not have the necessary scores to attend an "A" school), a great deal more productive by teaching him or her a skill.

Two possible faults with the JOBS program may surface. First, would be the possibility JOBS could be construed as a remediation program, and second would be the time lost to the fleet while the sailor attends a JOBS school. However, counter arguments can be supplied to both alleged shortcomings. In regards to the prospect of JOBS becoming a remediation program and thereby losing its appeal to possible attendees, JOBS will be treated as a part of the "A" school and the recruit will eventually attend. In this manner, the recruit will not be singled out as one needing extra help, but rather as one who will attend an "A" school after serving some time as a GENDET (Aiken: 14 Sept. 1979). Dr. E. Aiken of NPRDC states that JOBS is designed to teach concepts in the area of each JOBS curriculum, such as electronics, using the terminology of that curriculum (Aiken: 14 Sept. 1979). Therefore, the recruit should not feel that he is undergoing academic remediation.

In reply to the lost time argument, the initial program plan calls for approximately four weeks of JOBS study before "A" school entry. In the eyes of this investigator, a loss of four weeks is insignificant if one considers the weight of the potential benefits such as reduced attrition and greater use of the Navy's resources, that is, increasing the

skills of those sailors who in the past would have been ineligible for technical training. In this manner, more highly qualified "A" school candidates can attend more complex schools and more "A" school candidates in general will be available so that future shortfalls of "A" school candidates may be avoided.

In summary, JOBS is an approach to dealing with potential future recruiting shortfalls. Although JOBS will, if effective, improve the productivity and ability of the individual, its impact will not be reflected in personnel quality measures recorded during the recruiting process. JOBS, if it works, will, however, help the Fleet to accomplish its mission.

VII. QUALITY RECONSIDERED

What is quality? As noted in a recent GAO report, no official definition of what constitutes a quality first term enlisted person currently exists in the Department of Defense (GAO: FPCD 19-34, pg. 4). In pursuit of an official definition of enlistee quality, this author interviewed several persons who are involved with quality in its present unofficial definition (educational attainment and mental group) or have studied related problems such as enlisted attrition. Their ideas are restated here as a possible spring-board for further research into formulation of an expanded definition of quality.

Perhaps one of the more striking questions concerning what type of quality the Navy needs arises from the increasing automation and modularization of equipment in use throughout the Navy. Dr. Ed Aiken of NPRDC states that he has attempted to find historical data to support the "...straight line of quality requirements" put forth by the Navy (America's Volunteers: pp. 30-31), (Appendix C: pg. 2). Further elaborating, Dr. Aiken asks the question of whether the job (referring to all the tasks performed by sailors in a collective sense) is becoming easier because of automation, or is the job becoming more difficult because of the complexity of modern machinery? Dr. Aiken believes arguments can be made for either point, that is the job is becoming easier or more difficult, but in either case,

quality requirements should fluctuate depending on whether the job is easier or more complex (Aiken: 14 Sept. 1979). The crux of Dr. Aiken's comments reflect an uncertainty concerning exactly what qualifications the Navy needs of new recruits. Mr. Irwin Schiff, head of the Manpower, Training, and Reserve section of the Systems Analysis Division of the Office of the Chief of Naval Operations, makes a statement similar to Dr. Aiken's. Referring to a recent decision to eliminate the Parity Program, which was designed to reduce the possibility of large numbers of minorities being concentrated in just a few jobs in the Navy (Aiken: 14 Sept. 1979), Schiff stated that this would appear to indicate the "...qualitative needs of the Navy are going down". He references the impact of the now defunct Parity Program on the percentage of high school graduates among new recruits. The new goals if achieved, will mean 74% of new recruits will be from mental categories I, II, and III (A) which indicates, according to Schiff's figures, 72% of new recruits will be high school graduates (Appendix C: pg. 1), (Schiff: 11 Sept. 1979). Additionally, the lowered percentage of high school graduates will, of course, mean more non-high school graduates in the Navy (Schiff: 11 Sept. 1979).

Dr. Larry Goldberg, an econometrician with the Center for Naval Analysis, commented that if the Navy's output is not degraded when the quality, as measured by high school graduation/mental level, goes down, then the Navy is paying more money for recruiting (advertisement, etc.) than is

necessary. However, Dr. Goldberg continued, if the degradation is substantial, more money will have to go into recruiting to pay for the quality desired (Goldberg: 11 Sept. 1979).

The preceding paragraphs reflect concern that the Navy may not know its quality requirements. As also noted earlier, no official definition of quality exists, which brings into focus a dilemma: one cannot determine what quality is needed for the Navy unless some quality measures exist.

A recent General Accounting Office report addressed quality and reported the following factors as being "...considered most important in defining a quality enlisted person" (GAO: FPCD 79-34, pg. 5).

- Trainability
- Adaptability to military service and work environment
- Performance on the job
- Completion of enlistment tours

(GAO: FPCD 79-34, pg. 5) Despite the constructive criticism presented in the report, the GAO does not address the difference between the GAO's recommendations and what the services would require from a quality definition, namely, that a new definition of quality should allow the services to predict the future performance of a new enlistee.

The prediction of the future job performance of an individual has been studied for years by industrial psychologists (Krug: pg. 106). Various methods of evaluating job applicants have been devised, such as, interviews, aptitude tests, both mental and mechanical, and so forth. Many of these techniques are used in conjunction with each other. The end result of these evaluative techniques is to collect

information about the applicant so that the employer will be able to make more accurate predictions of the applicant's future expected job performance (Tiffin and McCormick: pg. 82).

The Navy, particularly under the AVF, is faced with the same problem as private industry - how to select people who will perform adequately. This problem is either compounded or reduced in its impact on the Navy by the "selection ratio." The selection ratio is defined to be the ratio of the number of applicants to be selected to the total number of applicants available (Ghiselle and Brown: pg. 142). When the ratio is small, only the best applicants need be hired because there are relatively few jobs for a large number of applicants. Unfortunately, the opposite situation appears looming in the future for the Navy because of the decline of the 17-21 year old population pool. The selection ratio may have to become larger as compared to the present. This higher ratio may reduce the amount of selection that can be accomplished, and more marginal enlistees may be the result (Ghiselle and Brown: pg. 142).

VIII. THE SUMMATION

This paper has attempted to discuss personnel supply and quality. The initial sections dealt with supply. The number of male 17-21 year olds will decrease to a point where the Navy will be forced to either recruit a greater percentage of this cohort to maintain its force size, or make better use of the enlistees it is able to attract. This paper examined evidence that the birthrate in the United States will not increase unless women revert to their more traditional roles as housewives exclusively - a very unlikely possibility. If projections are correct, the decline in numbers of 17-21 year olds will not be halted until well after the year 2000.

This thesis has examined statistics concerning high school graduation and has noted that although the absolute number of 17-21 year olds will decrease, a higher percentage of this cohort is projected to have a high school degree as compared to any time in the past. Additionally, it appears college may continue to attract approximately 50% of the high school graduates in the future.

Aggregate indices of mental ability were examined, such as literacy and SAT scores. From National Assessment of Educational Progress (NAEP) findings, it appears the 17 year olds in 1975 were more functionally literate on the average, than the 17 year olds in 1971. Additionally, nine year olds in 1975 scored higher on NAEP's literacy tests

when compared to their counterparts in 1971. This might lead to higher test scores on the SAT, ASVAB, etc. in the future.

The focus of the remainder of this thesis was on the demand for recruit quality. Two programs currently in operation which affect quality needed in recruits were reviewed. The Academic Remedial Training (ART) program is designed to increase the reading grade level of recruits who are found to read between the fourth and sixth grade levels. By increasing the reading ability of these recruits, it enables them better to deal with the many reading tasks required in the Navy. The Job Oriented Basic Skills (JOBS) project is still in its infancy and is designed to improve the basic skills of general detail sailors (those who are not assigned to any particular rating) who otherwise would be ineligible for "A" school because of low aptitude. JOBS will provide greater opportunity for normally "A" school ineligible sailors and will make more effective use of these individuals. The first class of JOBS training convened in July of 1979.

During the discussion of reading grade levels and the ART program, this thesis examined the complexity of various manuals and the reading grade levels of a large sample of recruits in 1975. The studies indicated a large disparity between the reading grade levels of the recruits and the manuals. In fact, the median RGL of 185 manuals was found to be 12.6, or between the freshman and sophomore college levels. The Navy is attempting to lower the RGL's of the

manuals. However, this does not necessarily ease what is potentially a large problem, because the comprehensibility of these manuals should be reviewed as well.

Lastly, a recent GAO report calling for an official Department of Defense definition of enlistee quality spurred an examination of quality. Several persons employed by the Navy who have conducted some research dealing with quality either directly or indirectly were interviewed. The most astonishing discovery to this investigator was that apparently little is known of the Navy's quality demand other than the goals used for recruiting high school graduates and mental categories I, II and III (upper). In fact, one researcher stated he has not been able to uncover the historical data supporting the present quotas. The end result of this is that an uncertainty exists as to whether the Navy is recruiting to meet its real needs.

(While this thesis was in the final stages of printing and approval, a report was released by the Carnegie Council on Policy Studies in Higher Education. Excerpts from the report, "Giving Youth a Better Chance: Options for Education, Work, and Service," printed in The Chronicle of Higher Education (3 December 1979), noted a number of circumstances facing the youth of the United States in the future: declining numbers of males 16-21 years old; an increasing percentage of the males eligible for the military that will be demanded by the military; increased competition between colleges, private industry, and governmental agencies for youths. Additionally, the report notes that "many youths

will never have had it so good." Issues such as youth unemployment and dropping out of high school are also addressed.

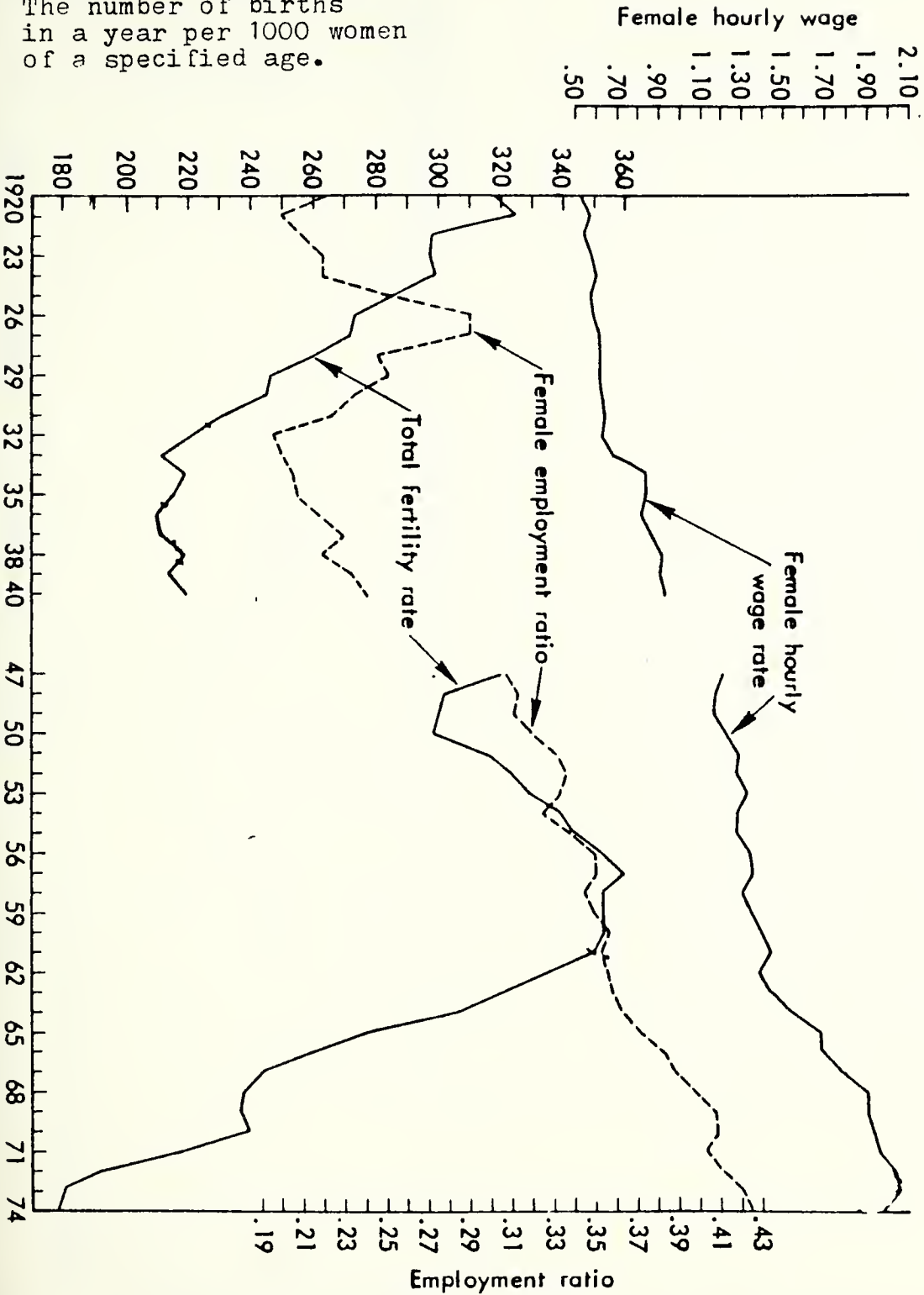
The significant aspects of the report in regards to this thesis are contained in the main concerns of the Carnegie Council about the future. The more pertinent of these areas are: reducing dropouts and absenteeism in high schools, improving basic skills (reading, writing, etc.) of high school graduates, providing work opporunities for high school youths for the development of work habits, and improving the paths into military service.

This report by the Carnegie Council illustrates the concern beginning to be expressed about the impact of the declining population of youths in the United States. Problems which were not as serious for the nation as a whole when a great many youths were available, now are being examined much more closely, such as the make-up of youth unemployment and unemployment statistics, and the basic skills held by high school graduates).

EXHIBIT 1

TOTAL FERTILITY RATE

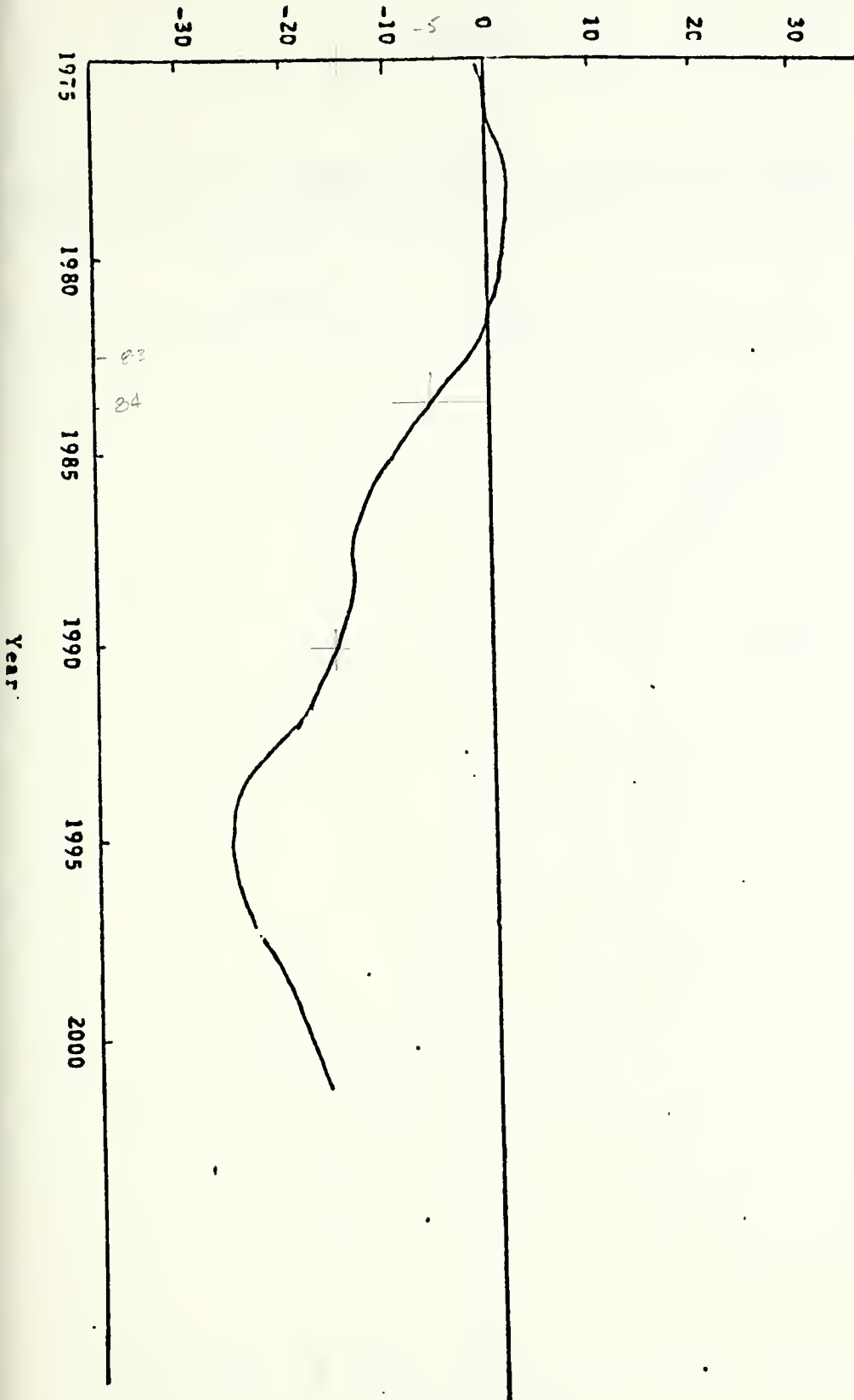
The number of births in a year per 1000 women of a specified age.



Source: The Emergence of Countercyclical U. S. Fertility By William P. Butz and Michael P. Ward, Rand Corp. R-1605-NIH, June 1977, pg. 27.

Total fertility rate and associated variables, 1920-1940 and 1947-1974

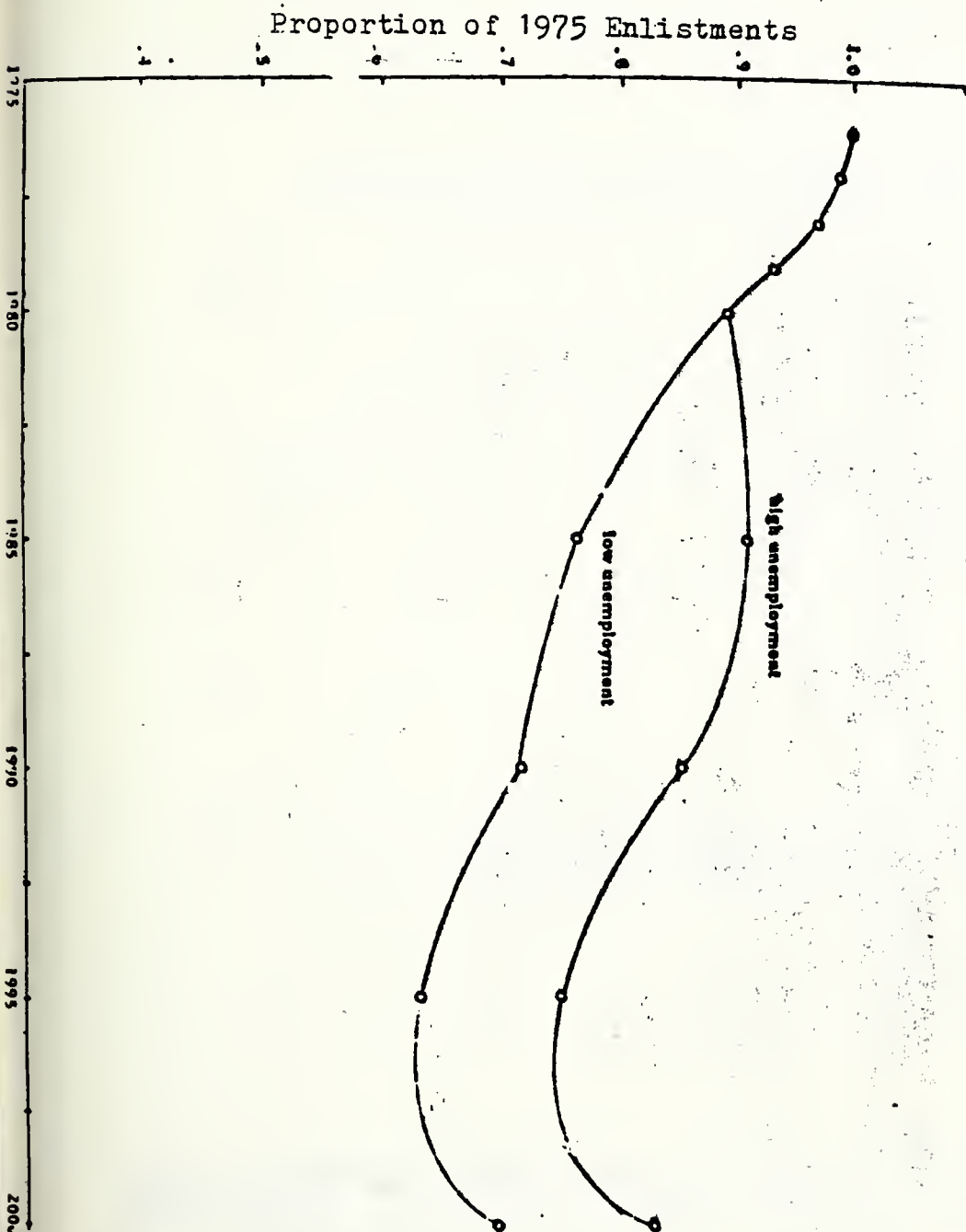
Percent Change from 1976 in Annual Estimates and Projections of
17 - 21 Year Old Male Population



Source: DOD Manpower Supply Scenario Through 2000, by David W. Grissmer and Kwan Kim, MATWTEC, Inc., June 10, 1977, pg. 4

EXHIBIT 3

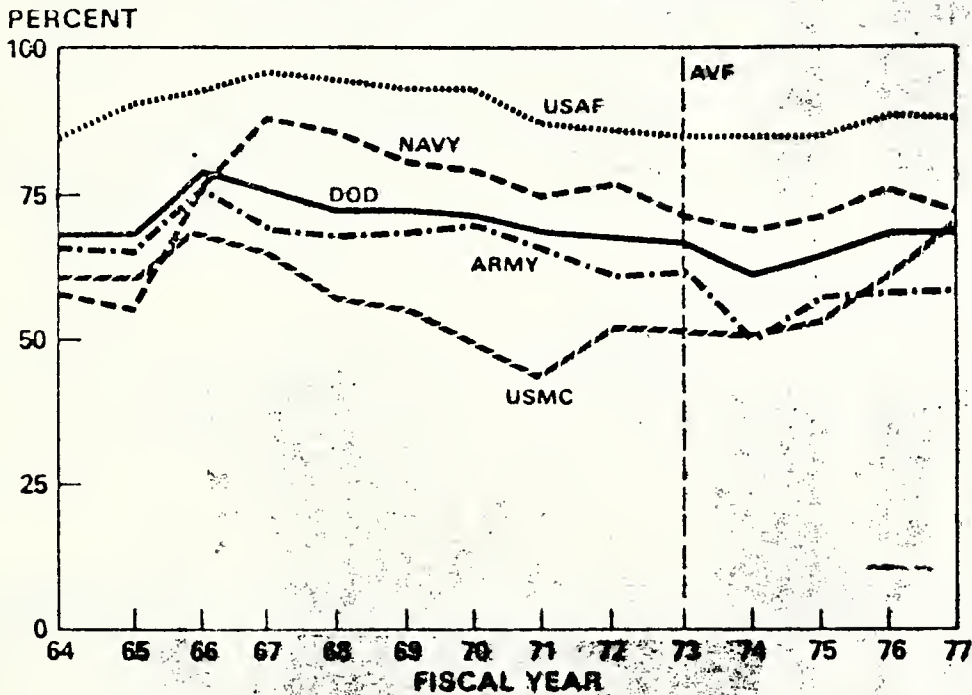
Projections of DoD Mental Category I and II High School Graduate Enlistments through the year 2000 using 1975 as Base Year Index



Source: DoD and Navy Manpower Supply Scenarios Through 2000 by David W. Grissmer and Kwan Kim, MATHTEC, Inc., June 10, 1977, pg.

EXHIBIT 4

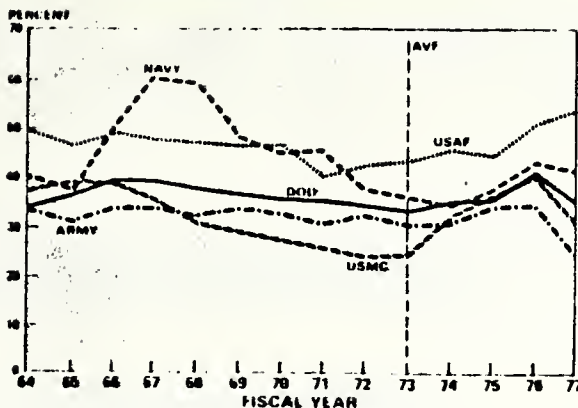
**HIGH SCHOOL DIPLOMA GRADUATE
PERCENTAGE OF TOTAL ACTIVE DUTY
NPS ENLISTED ACCESSIONS**



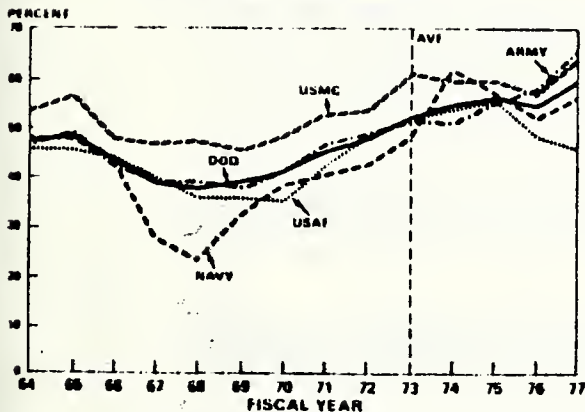
Source: America's Volunteers: A Report on the All-Volunteer Armed Forces, by the Office of the Assistant Secretary of Defense (Manpower, Reserve Affairs and Logistics), Washington, D. C., December 31, 1978, pg. 30.

Active Duty NPS Enlisted Accessions by Mental Category

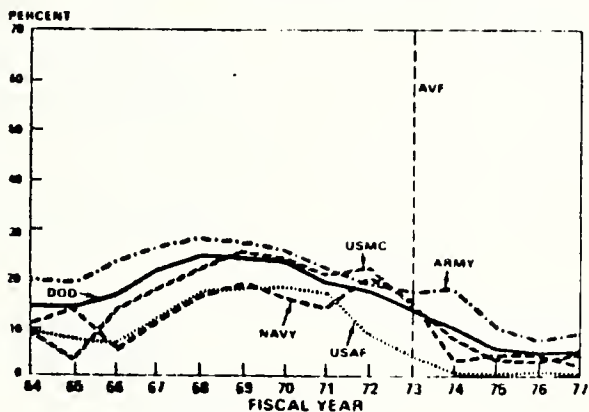
MENTAL CATEGORY I & II



MENTAL CATEGORY III



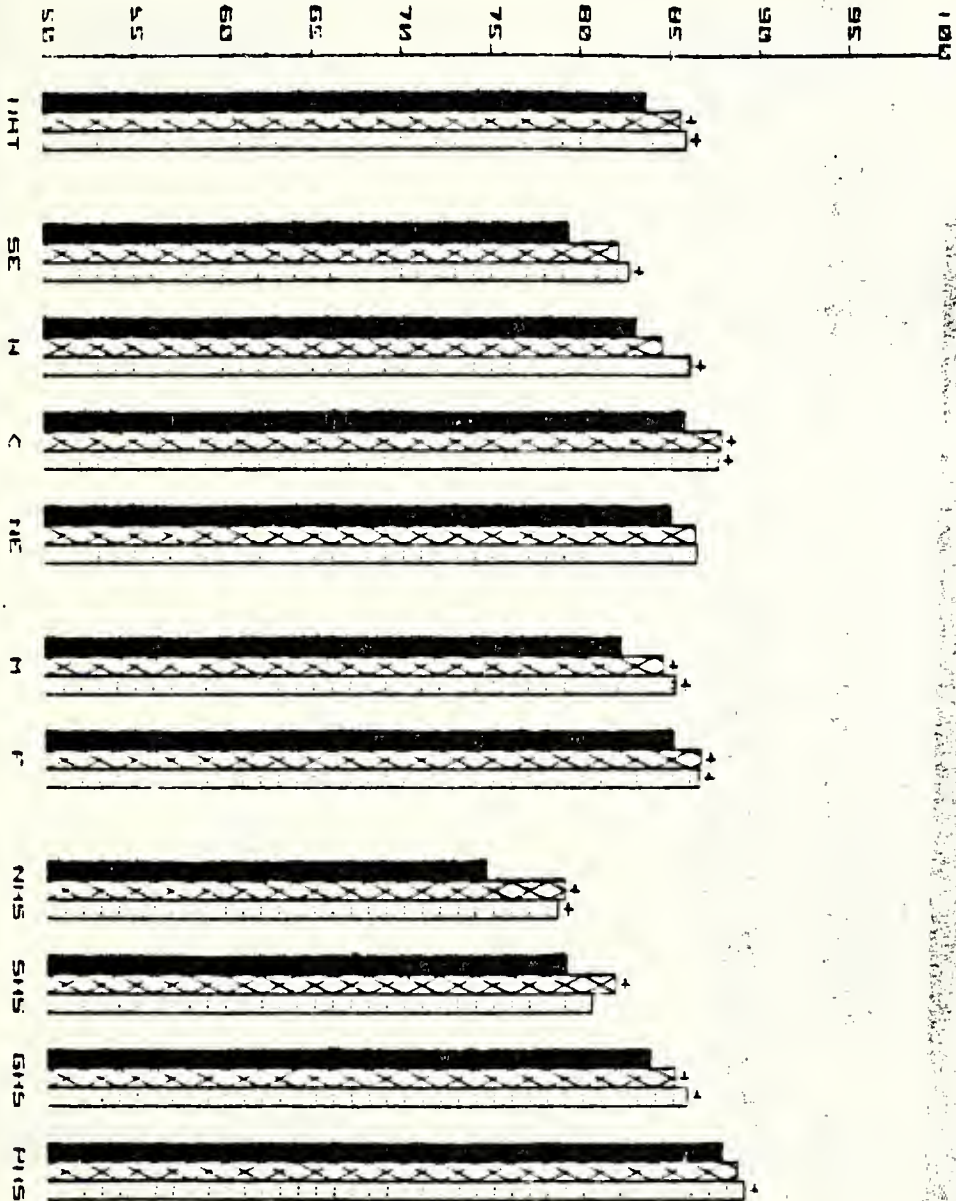
MENTAL CATEGORY IV



Source: America's Volunteers: A Report on the All-Volunteer Armed Forces, Office of the Assistant Secretary of Defense (Manpower, Reserve Affairs and Logistics), Washington, D. C., April 1978, pg. 26.

EXHIBIT 6

THE PERCENTAGES OF 17-YEAR-OLD STUDENTS ANSWERING THE INDIVIDUAL EXERCISES OF THE MINI-ASSESSMENT OF FUNCTIONAL LITERACY (MAFL) CORRECTLY.



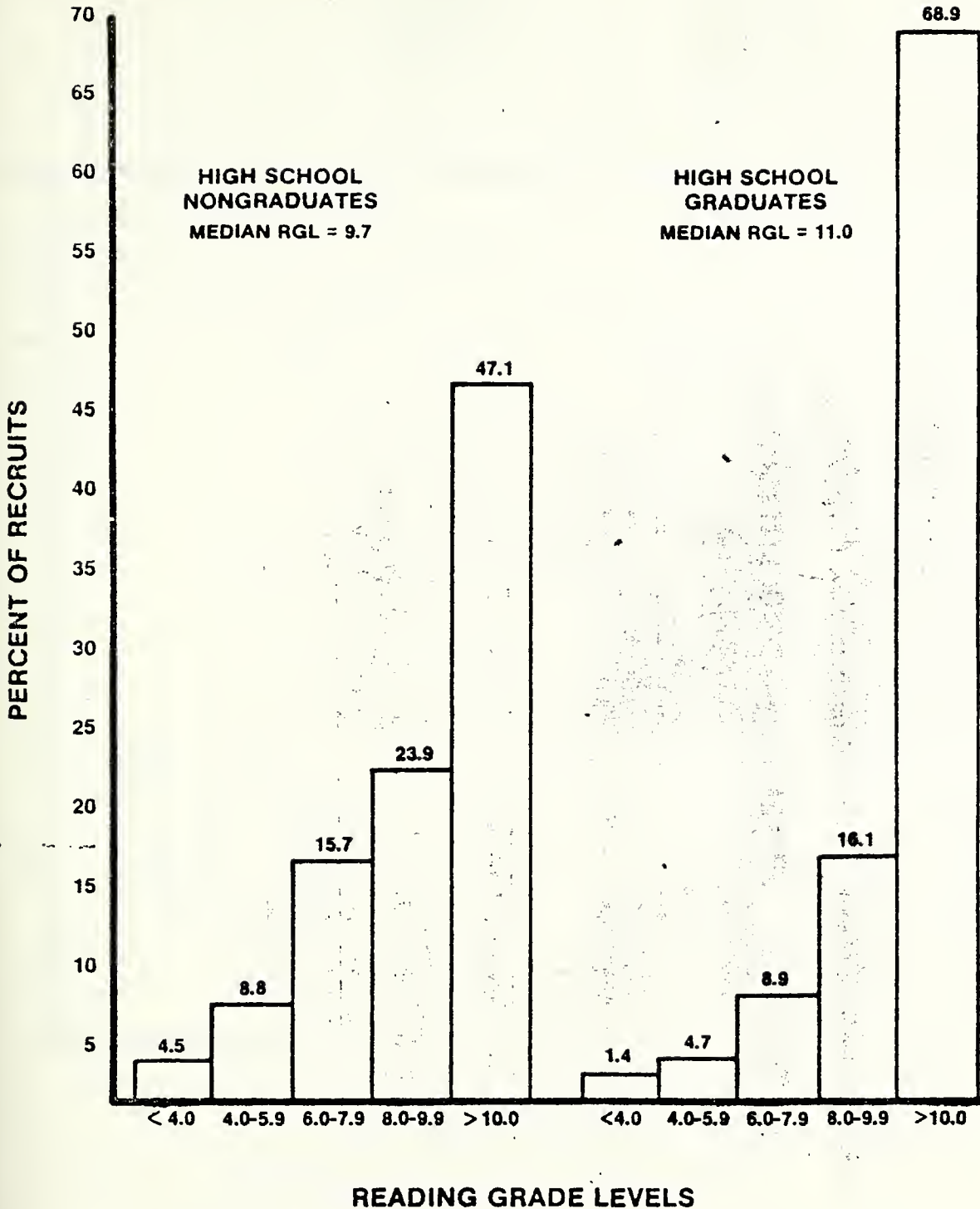
NHT-NATIONAL
 SE-SOUTHERST
 M-WEST
 C-CENTRAL
 NE-NORTHERST
 M-MALE
 F-FEMALE
 NHS-NO HIGH SCHOOL
 SHS-SOME HIGH SCHOOL
 GHS-GRADUATED HIGH SCHOOL
 PHS-POST HIGH SCHOOL

↑ SIGNIFICANTLY HIGHER THAN 1975 PERFORMANCE

■ 1976
 ▨ 1975
 □ 1974

Source: Functional Literacy - Basic Reading Performance, Summary Volume, Statistical/Documentary Report, 1974 and 1975 Assessments of 17-Year-Old Students, National Assessment of Educational Progress, Denver, Colorado, 1976, pg. 6.

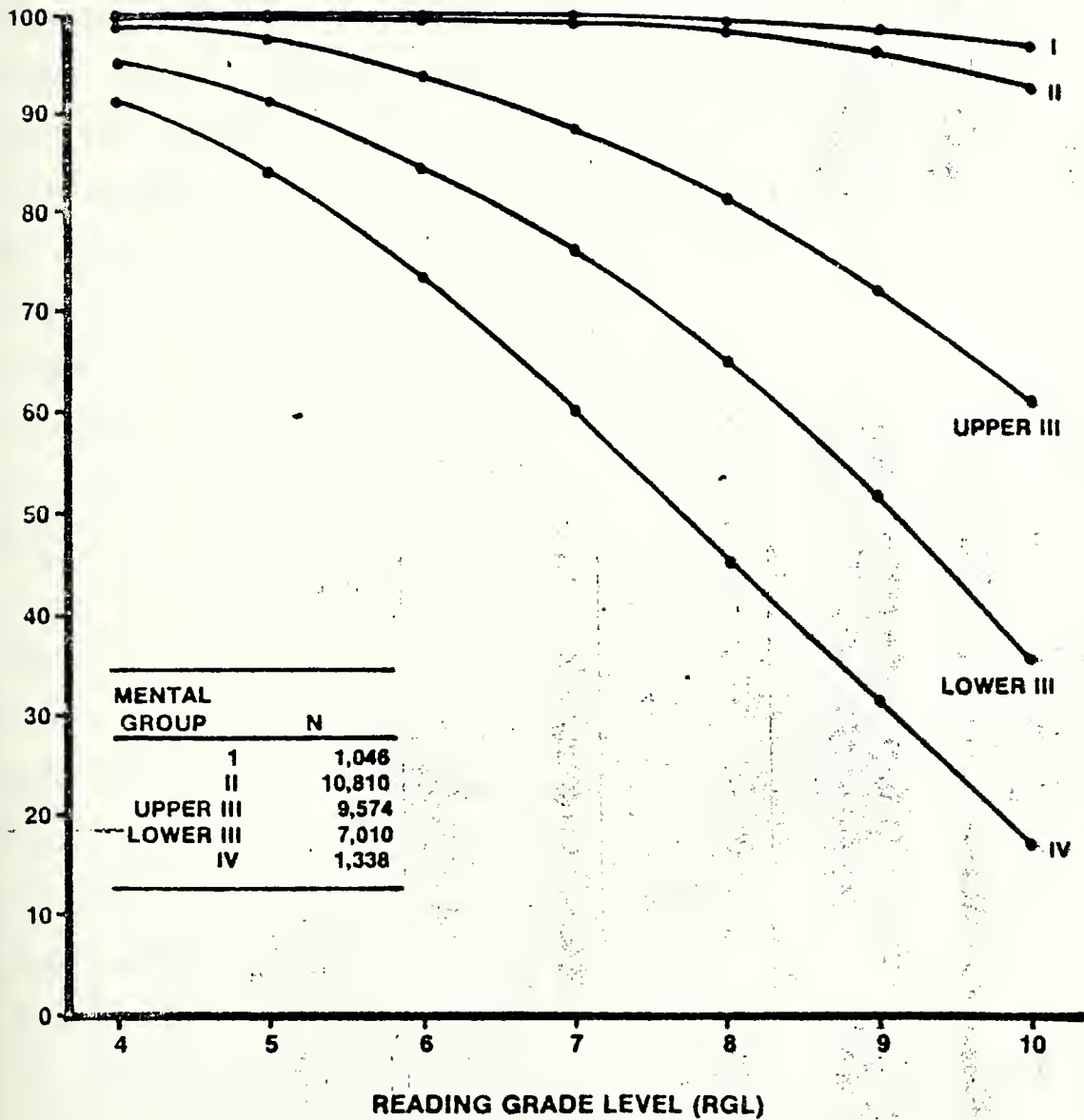
EXHIBIT 7



Distribution of reading grade level (RGL) scores for recruits who did (N = 24,227) and did not (N = 5,437) graduate from high school.

Source: Reading Skill Levels in the Navy, by Thomas McDuffy and William A. Nugent, Naval Personnel Research and Development Center, San Diego, California, April 1978, pg. 19.

EXHIBIT 8



Percentage of recruits in different mental groups scoring at or above a given RGL.

Source: Reading Skill Levels in the Navy, by Thomas M. Duffy and William A. Nugent, Naval Personnel Research and Development Center, San Diego, California, April 1978, pg. 9.

APPENDIX A

The following chart is based on in recruiting, DoD research persons concerned with quality, and from readings about the All Volunteer Force (AVF). From these sources this investigator constructed a table which is designed not to represent official doctrine of any of the service branches, but only to provide an easy-to-follow layman's explanation of the way educational attainment and mental category interplay. It is a fact that the military does not intend to take any persons into the services who score in the lowest mental category(V), because of Congressional limits placed on the military (Karpinos: pg. 5). It is also generally accepted that a high quality accession is one in mental category I or II with a high school diploma. (See, for instance, DoD and Navy Manpower Supply Scenarios Through 2000 by David W. Grissmer and Kwan Kim which addresses specifically the future decline in enlistments of the number of category I and II male high school graduates). A graphical breakdown of the mental categories of accessions from 1964 to 1977 (See Exhibit 5) illustrates the percentages of each category each service has enlisted over this time period. It is important to note three things from these data; 1) The increasing numbers overall of category III enlistees in recent years; 2) the decreasing number of category IV enlistees, and 3) the disproportionate share of quality enlistees entering the USAF.

TABLE 1-1

MENTAL CATEGORIES AND EDUCATIONAL ATTAINMENT

	I	II	III	IV	V	
AFQT						
% TILES	93-100	65-92	50-64 A AVG	31-49 B AVG	10-30 Lo	0-9
	Hi Quality	Hi Quality	Quality	Quality	Unqualified	
HSG	Acceptable	Acceptable	Accept	Marginally Acceptable	Not Acceptable	
	Hi Quality	Hi TO AVG Quality	AVG Quality	Lo Quality	Unqualified	
NHSG	Acceptable	Acceptable	Accept	Not Generally Acceptable	Not Acceptable	
	Acceptable	Acceptable	Accept	Acceptable	Acceptable	

APPENDIX B

DESCRIPTIONS OF THE EXERCISES USED IN THE MINI-ASSESSMENT OF FUNCTIONAL LITERACY

Because the exercises used in the Mini-Assessment of Functional Literacy are not in the public domain, we cannot reproduce them here. In lieu, we present a brief description of each exercise item and the question(s) asked about it.

- List of words beginning with "Fl..."
Which of these words comes first in a dictionary?
- Picture of four doors that might be in a school labeled "Principal," "Nurse," "Cafeteria," "Library."
Door where you might go for lunch?
- Replica of automobile insurance policy statement
 - A. What is the maximum amount for which this policy covers medical bills?
 - B. What is the maximum amount this policy would pay in case you injured another person in an automobile accident?
- List of five pairs of last names beginning with "J..."
You want to call Mr. Jones on the telephone. You will find his number between which names?
- Facsimile of four common traffic signs.
Which sign shows where you should ride your bicycle?
- Facsimile of detail from a road map.
 - A. By car, is Northtown closer to Rice Lake than to Hope?
 - B. Can you drive all the way from Northtown to Falls City on Highway 71?

C. Is Hope the town closest to Centerville?

Source: Functional Literacy - Basic Reading Performance,
Summary Volume, Statistical/Documentary Report, 1974 & 1975
Assessments of 17 Year-Old Students, National Assessment of
Educational Progress, Denver, Colorado, 1976, pg. 49.

APPENDIX C-1

SAT-VERBAL AND SAT-MATHEMATICAL MEANS:
TWO METHODS OF COMPUTATION

School year	All scores ^a	
	V	M
1956-57	473	496
1957-58	472	496
1958-59	475	498
1959-60	477	498
1960-61	474	495
1961-62	473	498
1962-63	478	502
1963-64	475	498
1964-65	473	496
1965-66	471	496
1966-67	467	495
1967-68	466	494
1968-69	462	491
1969-70	460	488
1970-71	454	487
1971-72	450	482
1972-73	443	481
1973-74	440	478
1974-75	437	473
1975-76	431	472
1976-77	429	470
1977-78	429	468
1978-79	427	467

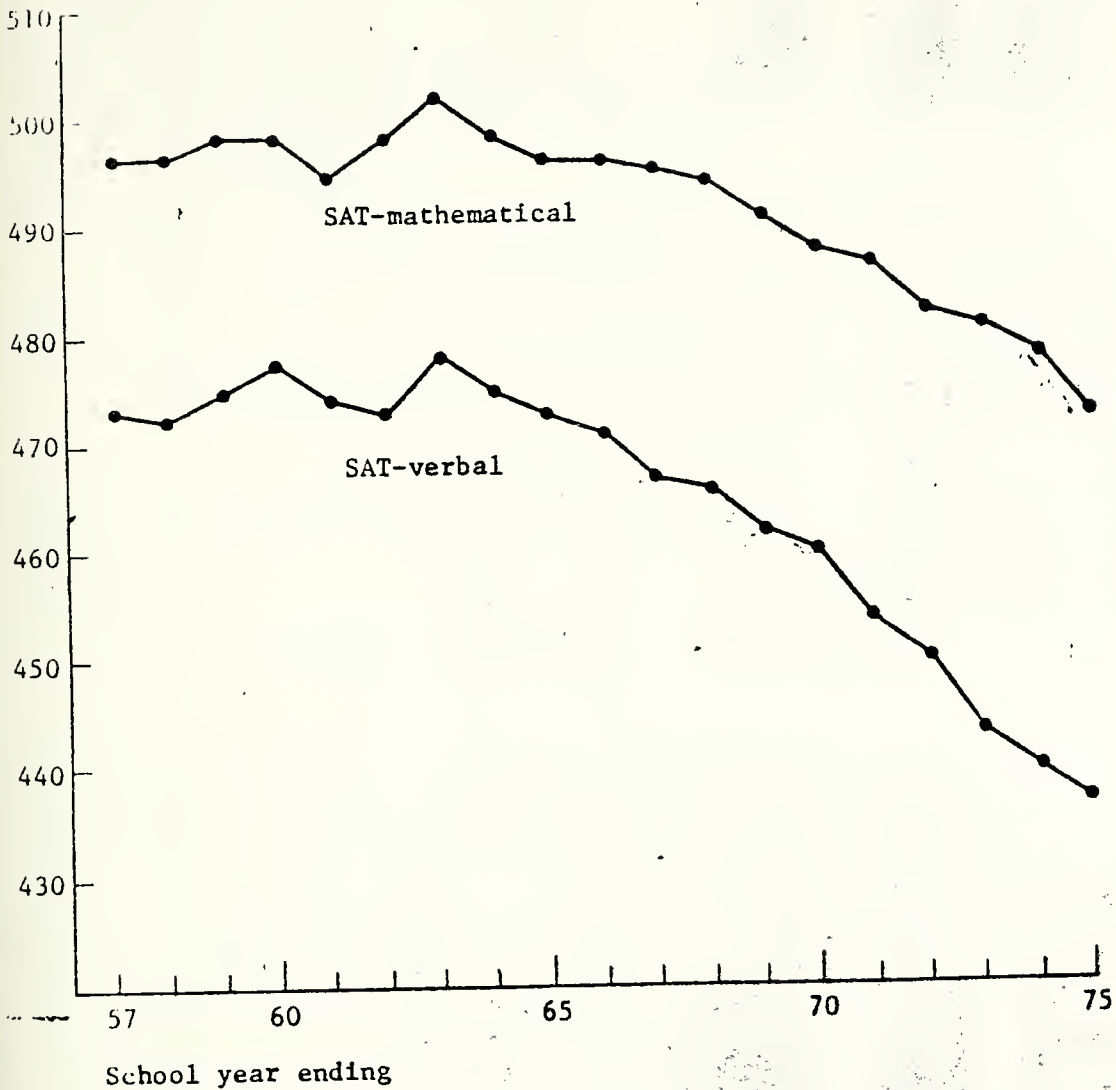
a. These are the values presented in Figure 1. These means represent all scores reported. Students represented in these means are aggregated without regard to their level of preparation, and students are counted as many times as they have taken the SAT.

Source: The SAT Score Decline: A Summary of Related Research by Hunter M. Breland, Educational Testing Service, Princeton, New Jersey, January, 1976, pg. 5.

APPENDIX C-2

SAT-Verbal and SAT+Mathematical Means for the Period 1957-1975*

SAT-verbal or mathematical mean



*These means represent all scores reported. Thus, persons having more than one score are counted more than once.

Source: The SAT Score Decline: A Summary of Related Research by Hunter M. Breland, Educational Testing Service, Princeton, New Jersey, January, 1976, pg. 4.

APPENDIX D

MAR 13 1979

From: Chief of Naval Operations
To: Commander, Navy Recruiting Command

Subj: Recruiting Goals and Policies

Ref: (a) CHNAVPER (Pers-2B) memo, Pers-21231/mcv, 1100,
Ser 891/78 of 16 Oct 78
(b) COMNAVCRUITCOMINST 1130.8A (CRUITMAN-ENL)

Encl: (1) Priority Minority Accession Programs/Ratings
(2) Priority Listing of Occupational Specialties
(3) Critical Accession Ratings

1. Reference (a) is cancelled and superseded by this letter which consolidates and updates previous policy guidance with regard to general recruiting goals and candidate enlistment eligibility.

2. To be eligible for enlistment, a candidate must attain a minimum derived AFQT percentile score of 21.

3. All male USN (less Filipino Nationals recruited in accordance with chapter 13 of reference (b)) and USNR nonprior service (NPS) recruits must obtain a SCREEN score of 70 or above to be eligible for enlistment in FY 79. However, applicants who qualify for and are assigned to a Class "A" School (in either the Specific School Guarantee or OCCSPEC Guarantee Program) may be granted a SCREEN score waiver and enlisted, provided they have a minimum SCREEN score of 60 and meet all other basic eligibility requirements for enlistment.

4. In order to be reported as "school eligible" (SE), a candidate must meet one of the following criteria:

- a. AFQT 49 or higher.
- b. ASVAB WK+AR=100 or higher.
- c. Be enlisted with a Class "A" School guarantee or in the SUBFARER program.

APPENDIX D

5. High School Graduate Goals

- a. For FY 79, the NPS active duty male high school graduate (HSG) goal is 82 percent. The NPS active duty male high school diploma graduate (HSDG) goal is 76 percent, with the remaining 6 percent to be the recipients of a GED or CPT.
- b. For FY 79, all female applicants must be high school graduates (diploma, GED or CPT acceptable). The female HSDG target is 94 percent and the female HSDG floor is 76 percent. Non-HSDG female applicants must have a GED or CPT.
- c. HSG/HSDG attainment is to be reported in the following categories:
 - (1) Total (male + female) NPS active duty.
 - (2) Male NPS active duty.
 - (3) Female NPS active duty.

6. School Eligible (SE) goals are as follows:

- a. For FY 79, the NPS active duty male SE goal is 83 percent. Also, for NPS active duty males, an FY 79 floor of 75 percent has been established for the following racial and ethnic groups: Caucasian, Black, Native American/Asian, and Hispanic.
- b. For FY 79, all NPS active duty females must be school-eligible.
- c. For FY 79, all USNR-R applicants must be school-eligible.
- d. The enlistment of highly motivated, male, school-eligible (SE), non-high school graduate applicants in the school guarantee program is authorized, at the discretion of CNRC, in numbers not to exceed the following FY 79 monthly ceilings: October through January -- 25/month; February through May -- 240/month; June through September -- 25/month. For the October-January and June-September time frames, applicants may be enlisted for any enclosure (2) program for which specific school eligibility is established. For the February-May time frame, this

enlistment provision is restricted to Priorities 1 through 9 of enclosure (2). Monthly, CNRC will report name, SSN and test scores of personnel enlisted under this provision to NMPC-48 (Pers-55); negative reports are not required. Guidance to the recruiting field will emphasize that the primary purpose of this provision is enlistment of upper mental groups category (particularly MG I-II), non-high school graduate personnel with specific school guarantees as a counter attrition initiative.

7. Monthly accessions should not exceed 6 percent MG UIV, all of whom will be high school diploma graduates (GED or CPT not acceptable).

8. The Navy's stay-in-school policy is reaffirmed and must remain visible to all recruiters. While it is not desired to encourage noncompletion of high school, CNRC is authorized to enlist seventeen-year-old male non-high school graduates.

9. The following guidance applies to the Delayed Entry Program (DEP):

- a. Individuals may be in the DEP for AEF and NF up to one year; for ATF, 60 percent of goal may be in the DEP from one year to 270 days, and 100 percent under 270 days. For 4YO school programs, 20 percent of goal may be in DEP from one year to 270 days and 100 percent under 270 days, and for 5YO school programs, up to 270 days DEP is authorized. Individuals in nonschool programs may be in DEP for 270 days if they are, or will be, high school diploma graduates; other personnel are limited to 180 days in the nonschool program DEP, with the exception of Group "D" (NHSG/NSE) recruits who may be directly shipped but for whom DEP is not authorized. RZs in the following categories may be in the DEP for up to 180 days:

- (1) RZs authorized to reenlist in a rating in CREO Groups A, B, or C.
- (2) RZs authorized to reenlist in paygrade E3 with striker designation in a rating in CREO Groups A, B, or C.
- (3) RZs authorized to reenlist in paygrade E3 without a striker designation.

b. USN program ceiling is 80 percent of the USN chargeable monthly recruit goal, except for 6YOs which is 100 percent. USNR program ceiling is 80 percent of the TAR Enlisted and Active Mariner monthly recruit goal. USNR Ready Mariner and Reserve Female Enlistment Program ceiling is 100 percent.

c. Non-high school graduate personnel may be in the DEP for OCCSPECS. For the months October and November 1978, non-high school graduate personnel will not exceed 25 percent of total OCCSPEC DEP. For the months December 1978 through September 1979, there is no restriction on percent non-high school graduate in OCCSPEC DEP.

10. Minority nonprior service active and reserve recruiting goals are:

- a. The long-range Black accession goal is 12 percent of total accessions for both males and females. A long-range goal of 5.3 percent is established for both male and female accessions from the Hispanic Heritage ethnic group. The accession goal for Native American and Asian Heritage ethnic groups combined is 1.4 percent.
- b. No ceiling applies to minority accessions, except for OCCSPEC and rating distribution constraints noted in paragraph 10.c.
- c. It is desirable that at least 25 percent of the total school guarantee program accessions for the Black and Hispanic minority groups be enlisted in the programs/ratings listed at enclosure (1), which are large communities offering upward mobility but presently underrepresented in minority participation.
- d. In order to ensure that the maximum number of minorities receive school seats, all minority members meeting qualification standards should be strongly encouraged to enlist under one of the school guarantee programs.
- e. Racial/Ethnic Minority quality goals take precedence over quantity goals.

11. Women enlistments are governed as follows:

- a. All female school seats will be sold as specific school guarantees.
- b. School seat quota will not be exceeded.
- c. School quotas will be given priority over SEAMAN/AIRMAN programs.
- d. Non-attainment of female NPS school quotas may not be added to female SEAMAN/AIRMAN quotas. However, COMNAVCRUITCOM is authorized to overship female NPS SEAMAN/AIRMAN quotas on a one-for-one basis with female RZs shipped with Class "A" School guarantees. COMNAVCRUITCOM will provide to OP-135 a monthly numerical report of female RZs shipped (specific "A" School guarantee identification required) and corresponding female NPS SEAMAN/AIRMAN overships.
- e. Nuclear Field (non-rating specific), AV and CTR/CTT reservations for females satisfy the specific school guarantee requirement.

12. Annual accession objective for DPEP is 840; eligible ratings are those listed in CREO Groups A and B. Although no monthly quotas are assigned, for accounting purposes the monthly target should be 70 DPEP accessions. A progress report by rate and rating is to be submitted monthly.

13. The monthly 6-month recruiting quota letter will specify a quota floor of 600 (FY 79) continuous/broken service reenlistments (RZs) in goal skills per month. Attainment of 980 per month is the target to achieve CREO objectives in FY 79. This includes a 545 rating-affiliated/435 nonrating-affiliated target per month. The 600 RZ monthly quota floor is made up of 350 NAVET/250 OSVET. This mix may be adjusted to 400 NAVET/200 OSVET, if desired, in view of previously directed OSVET accession quality criteria. NAVETS who were previously E4 in CREO Category A, B, or C within CREO Groups A, B, and C may be enlisted in paygrade E4.

14. The following controls will apply to OSVET enlistments:


- a. For OSVETs, E3 and below, dependency waivers for more than a spouse and one child are not authorized,

except in the case of those OSVETs who were E4, reverted to E3 and enlisted with a PRISE II option.

- b. For OSVETs, E3 and below, waivers for RE-4 reenlistment codes are not authorized.
 - c. OSVETs in paygrades E1 or E2 with 2 or more years of active duty will not be recruited.
 - d. OSVETs, E3 and below, with more than 4 years since discharge will not be recruited.
 - e. All OSVETs, E3 and below, must be school eligible.
 - f. All OSVETs, regardless of paygrade, with more than 2 years since last release or discharge from active duty, must attend recruit training.
 - g. All OSVETs, E4 and above with skills that are convertible to Navy rates/ratings in CREO categories A or B, or open skills, will be submitted to NMPC-48 (Pers-55) via Navy Recruiting Command (Code 33) for determination of entry paygrade.
 - h. All OSVETs, E4 and above, not covered by paragraph 14.g. above, must be eligible for enlistment under the PRISE II program. PRISE school seats will be used for PRISE II OSVETs required to attend recruit training.
15. The "Q" quotas will be considered met if attainment is within (+ or -) 2 percent of stated quota. Over or under-achievement will be compensated for in subsequent monthly attainment.
16. Exact attainment of school program quotas is desired.
17. The following is a priority listing of USN and USNR enlisted recruiting programs:
- a. 6YO Nuclear Field (NF).
 - b. 6 YO Advanced Electronics Field (AEF) and 6YO Advanced Technical Field (ATF).

- c. Occupational Specialty/4YO School Guarantee, Ready Mariner, Active Mariner, 5YO Program and SUBFARER. Enclosure (2) provides a priority listing of OCCSPECS and enclosure (3) specifies critical accession ratings.
- d. Reenlistees (applicants with either Navy or other-Military prior service, under continuous or broken service conditions).
- e. TAR enlisted.
- f. 4YO SEAMAN/AIRMAN and ATP Active Mariner.

18. At least 75 percent of Nuclear Field enlistees must be submarine volunteers.



REAR ADMIRAL
REAR ADMIRAL, U.S. NAVY
DIRECTOR, MILITARY PERSONNEL
AND TRAINING DIVISION

Copy to:
COMNAVMIIPERSCOM

NAVY PERSONNEL RESEARCH AND DEVELOPMENT CENTER
SAN DIEGO, CALIFORNIA 92152

JOB-ORIENTED BASIC SKILLS (JOBS)
PROJECT PLAN

27 June 1979

APPENDIX E

JOB-ORIENTED BASIC SKILLS (JOBS)
Project Plan

I. BACKGROUND

The Navy's prime enlistment pool¹ currently is declining and will continue to decline into the 1990's. Assuming that manning requirements will remain essentially the same in the foreseeable future, major shortfalls will occur, unless compensatory actions are taken to reduce the demand on the prime pool. DoD-wide, 50 percent of all enlistment rejections are based on mental qualifications.² In theory, therefore, the available pool of enlistees could be expanded by relaxing mental standards.

Under the JOBS program concept, lower-aptitude or school-ineligible personnel desiring technical training would be given the opportunity to voluntarily participate in a specialized training program that would provide them with the prerequisite basic skills and knowledge required to successfully complete an "A" school. These personnel would be selected during recruit training, serve a period of time in the Fleet as a member of the general detail (GENDET) force, attend the JOBS school, attend the follow-on "A" school, and return to the Fleet as a designated striker.³ Since receiving orders to JOBS and "A" School is contingent on successful performance as a GENDET, this procedure is expected to create an incentive to "stick it out" as a GENDET, thereby lowering the high GENDET attrition rate currently experienced. In addition, by requiring a period of GENDET service, the overall GENDET force level is maintained.

The duties, responsibilities, and authority of the various participants in the JOBS project are contained in the following paragraphs.

A. Organizational Responsibilities

1. Chief of Naval Operations (OP-13)--OPNAV JOBS Coordinator

Act as Liaison between OPNAV and the U. S. Office of Education, Chief of Naval Education and Training, Naval Personnel Research and Development Center, and the Fleets in the Execution of the JOBS Program

Integrate JOBS School Seats into Navy "A" School Plan

Provide Assistance to Chief of Naval Education and Training for Outyear Planning

¹Physically qualified, male, high school graduates aged 18-20 in mental categories I, II, and upper III.

²What are the capabilities of the Selective Service System? Government Accounting Office Report to the Congress FPCD-79-4, December 14, 1978.

³In order to get an early test of the curriculum materials, the first few classes of JOBS students will be assigned directly from Recruit Training (See IV. JOBS TRAINING PIPELINE).

Advise OP-01 as to the Status of the JOBS Program

(Point of Contact: OP-135K)

2. Navy Military Personnel Command (NMPC 4) - JOBS Student Assignment Coordinator

Issue Orders that Direct Students to JOBS and "A" School Seats

Approve and Promulgate Policy Concerning Student Selection and Assignment

(Point of Contact: NMPC 481)

3. Chief of Naval Operations (OP-10)--OPNAV RDT&E JOBS Coordinator

Ensure Proper Funding of JOBS R&D Program

Ensure that JOBS R&D Program is Properly Managed, Technically, Sound, and Documented

(Point of Contact: OP-102)

4. Chief of Naval Education and Training (Code N5)--JOBS Training Coordinator

Prepare Test and Evaluate Site

Provide Military Management of JOBS Site

Prepare Outyear Planning Documents

Provide "A" School Materials for Curriculum Development

Provide Apprenticeship Students for Entry Level Testing

Provide Operational Funding Support

(Point of Contact: Code N-532)

5. Navy Personnel Research and Development Center--On-Site RDT&E Project Director

Define Resource Requirements for JOBS Test

Recommend Student Selection Criteria to OP-01/CNMPC

Develop JOBS Curricula

Provide Instructional Services

Conduct JOBS Test and Evaluation

Control Academic Aspects of the JOBS Schoolhouse

Provide Curricular Materials to the Commissioner of Education as Provided in the Memorandum of Agreement

(Point of Contact: Code 309)

The Department of Health, Education and Welfare, through the U.S. Office of Education (USOE), is partially funding the JOBS project (vis-a-vis curricula development). The details of the U.S. Navy/HEW (USOE) support agreement are contained in a Memorandum of Understanding signed on May 29, 1978 by the Chief of Naval Personnel and the Commissioner of Education (see attachment 1).

II. PROCEDURES

A. JOBS Instructional Strands

A study was made of "A" schools to identify those which have had chronic difficulty in filling their quotas with fully qualified personnel. The extent of the shortfall was determined by the percentage of students who received a waiver of the Armed Services Vocational Aptitude Battery (ASVAB) standards. The study also considered the number of students trained annually and the basic skill demands of the specific school. The ratings identified as having shortfalls of fully qualified personnel were grouped into four JOBS occupational clusters or strands. These strands and the follow-on Navy "A" schools associated with them are shown in Table 1.

Table 1

JOBS Strands and Associated Navy "A" Schools/Ratings

JOBS Strand	Associated Navy "A" Schools/Ratings
I. Propulsion Engineering	Boiler Technician (BT) Machinists Mate (MM) Engineman (EN)
II. Operations	Quartermaster (QM) Operations Specialist (OS)
III. Administrative Clerical	Personnelman (PN) Yeoman (YN) Storekeeper (SK) Radioman (RM)
IV. Electronics	Aviation Antisubmarine Warfare Technician (AX) Aviation Electronics Technician (AT) Aviation Fire Control Technician (AQ)

B. JOBS Curricula

1. Critical Characteristics. The object of Project JOBS is to develop the specific skills and knowledge prerequisite to particular Navy technical training courses. Thus, for each JOBS trainee, curricula will focus on the specific skill and knowledge requirements of the follow-on "A" school students are scheduled to attend. Training materials used to develop these skill and knowledge requirements will be derived from the technical area within which each student will be trained. The JOBS approach provides the following advantages:

- a. Incidental learning of technical content while developing prerequisite skills and knowledges.
- b. Decrease in the training transfer gap between JOBS and follow-on training.
- c. Decrease in the time interval between training and use of the newly acquired skills and knowledge.
- d. Perception by the student that JOBS is integral to his follow-on technical training.

2. Development. A competitive procurement package issued by NPRDC for developing JOBS curricula resulted in a contract award to Northrop Services Inc. (NSI). The contract performance began in October 1978 and will continue for a period of 2 years. The contractor has prime responsibility for all aspects of the instructional developmental process, including: (1) the task analyses required to support the curricula design, including the assessment of entry level skills and knowledge, (2) development and sequencing of learning objectives, including assessment procedures and performance standards, (3) design of skill and knowledge tests for diagnostic and program evaluation purposes, (4) production of all lessonware, including learning and instructor guides, student workbooks and exercises, and associated training equipment/aids, and (5) revisions and modifications of instructional materials.

NAVEDTRA 110, "Instruction Systems Development," is being used as a general guide for curriculum materials. The schedule of selected deliverables under this contract is provided in attachment 2.

3. Curriculum Revision. The JOBS curricula will be revised based on the performance of students in both the JOBS and "A" schools. In addition, a sample of the JOBS students at each "A" school will be interviewed for feedback on the adequacy of the JOBS program, and JOBS characteristics will be assessed through objective classroom observation.

C. JOBS Test Site

Building 242 at the Service School Command, Naval Training Center, San Diego, CA has been designated the "school house" for JOBS and will be available by June 1979. This building includes 12 classrooms, 10 with a maximum seating capacity of 25, and two with a maximum seating capacity of 15. In addition, there is adequate office space for the contractor personnel, the instructional staff, NPRDC on-site Liaison Officer and instructional monitors, and the Command staff.

D. Instructional Services Support

JOBS instructors will be obtained through a task order contract with the San Diego Community College District (SDCCD). Since the proposed JOBS test site is within the district's geographical jurisdiction, the JOBS Program qualifies for these services providing certain requirements are met. For example, instructional services will be funded only when a pupil to teacher ratio (PTR) of 21 to 1 is maintained. A 15 to 1 PTR is planned for the JOBS project, however, because of the closer student-instructor interaction required. Therefore, the difference between average daily attendance (ADA) funding for the 21:1 and 15:1 ratios will be funded under the JOBS project.

SDCCD will be responsible for hiring instructors with the skill and background requirements established by NPRDC for maintaining the academic performance records of students, for providing data required by the state, and for curriculum revision. An SDCCD on-site administrator will schedule and assign instructors to JOBS classes.

III. JOBS TRAINING PIPELINE

As with all Navy training programs, JOBS will be affected by surges and ebbs in the numbers of incoming recruits and the availability of "A" school seats. When the JOBS-eligible recruit pool is the largest, follow-on "A" School seats are likely to be filled or nearly so by completely qualified recruits. Conversely, when "A" school seats are most plentiful, the JOBS eligible recruit pool will usually be at its lowest ebb.

To overcome this problem, JOBS will eventually be operated on a delayed-entry basis, much like the Programmed Student Input (PSI) procedure used with "A" school-qualified personnel. That is, students will be selected for the program during those periods when recruit input is largest, and begin their JOBS training when there are a number of vacant "A" school seats. Initially, however, in order to allow for a timely validation of the experimental curricula, a limited number of students will enter JOBS training immediately following completion of recruit training.

The first JOBS students will be enrolled in the JOBS Propulsion Engineering Strand and commence training on 30 July 1979. Potential JOBS students will be selected from June 1979 through October 1979. Those selected during this period at RTC San Diego will enter JOBS training at the Service School Command, San Diego from August 1979 through January 1980. These students will be Direct-Input trainees (i.e., entering JOBS training directly from recruit training). Those selected at RTC Great Lakes will be "Fleet" trainees; and as such will enter school after they have successfully completed a 6 to 18 month GENDET assignment. Those selected at RTC Orlando will be used as backup for both Direct-Input and Fleet trainee aspects of this program.

The first JOBS students will be enrolled in the JOBS Propulsion Engineering Strand and commence training on 30 July 1979. Scheduled enrollment in the remaining three strands is as follows; Operations, 26 November 1979; Administrative-Clerical, 7 January 1980; and Electronics, 18 February 1980. JOBS graduates will enter "A" schools according to the schedule presented in attachment 3.

IV. STUDENT SELECTION AND PLACEMENT

Military classifiers in the RTC Enlisted Classification Units (ECUs) will select JOBS students beginning in June 1979 using the criteria shown in Table 2. The selection and placement procedures for JOBS students are summarized on the next page:

Table 2
JOBS Selection Criteria

JOBS Strand	Associated Ratings	Selection Criterion (ASVAB Subtest Composites/Score Range)
I	BT	MK + AI = 75 to 93
	EN	MK + AI = 75 to 93
	MM	MK + AI = 75 to 93
II	QM	WK + AR = 85 to 95
	OS	WK + AR = 80 to 99
III	PN	WK + AR = 89 to 103
	RM	WK + AR = 89 to 97
	SK	WK + AR = 85 to 98
	YN	WK + MO + AD = 133 to 152
IV	AV (AT, AQ, AX)	MK + E1 + GS = 155 to 162
		+ AR = 200 to 214

Notes.

1. ASVAB composites include subtests on mathematical knowledge (MK), automotive information (AI), word knowledge (WK), arithmetic reasoning (AR), numerical operations (NO) and attention to detail (AD).

2. Recruits selected for training must meet physical and administrative qualifications set forth in BUPERSINSTR 1236.4A for individual ratings.

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1. Records of incoming recruits to be assigned to general detail (GENDET) duties will be screened to identify those with an Armed Forces Qualification Test (AFQT) score of less than 45.
2. The ASVAB subset scores of identified recruits will be compared against the ASVAB requirements of the Navy ratings associated with JOBS strands. If a student's scores meet the criterion for any of the ratings (see Table 2), he is eligible for the JOBS strand leading to that rating.
3. The potential student will then be interviewed by the RTC classifier to determine whether he is interested in the JOBS strand(s) for which he is eligible.
4. If the student volunteers for JOBS training, a service record entry will be made identifying him as a JOBS candidate. Also, the student must sign an Administrative Remarks Page (NAVPERS 1070), which represents a contractual agreement between the Navy and the prospective JOBS student. The agreement signed by direct-input trainees (See attachment 4) requires satisfactory completion of recruit training before entering the JOBS program. The agreement signed by Fleet trainees (see attachment 5) requires meeting this requirement and, in addition maintaining a satisfactory level of performance, military bearing, and conduct during their GENDET assignment. Those recruits meeting all qualifications for JOBS but who elect not to volunteer, will be identified as a control group.
5. The ECU classifiers will notify Naval Military Personnel Command (NMPC-48) of the selections, and appropriate orders will be issued directing students either directly to JOBS training or to a Fleet assignment. These personnel will be listed in the JOBS program computer tracking system for subsequent evaluation.
6. After Fleet trainees have completed a period of active duty, their Commanding Officer will complete a specially designed performance rating form (see attachment 6) and forward it to OP-01. On this form, the Commanding Officers will compare prospective trainees with peers as to performance, the amount of supervision required, military bearing and conduct, and indicate whether or not the individual(s) are recommended for JOBS training.
7. NPRDC, through its computer tracking system, will provide NMPC and OP-01 with the names and social security numbers of personnel who will be returning from the Fleet for JOBS training so that orders can be issued and performance evaluation forms distributed.

V. PROGRAM EVALUATION

A. Predictor and Criterion Variables

Table 3 presents the predictor and criterion variables that will be used to analyze JOBS Program effectiveness.

1. Predictor variables. The ECU classifier will obtain information on prospective JOBS trainees and an appropriate cohort control group during interviews, recording the information obtained on an NPRDC form. Their Gates-MacGinitie Reading Test Scores will be obtained from the Chief of Naval Technical Training (CNTT) (11-824). Upon arrival for JOBS training, a questionnaire

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will be administered in order to obtain information on attitudes toward studying, expectations about the JOBS training, and career goals in the Navy Fleet returnees will be requested to provide a list of any training completed since Apprenticeship School. All JOBS trainees will take an entry diagnostic test that has been developed for the specific strand the individuals are scheduled to attend.

Most of the school data shown in Table 3 as predictor variables will, at a later stage, be used as criterion variables, as discussed below.

2. Criterion variables. All schools will provide, performance data for JOBS, Control, and "A" School qualified students. Performance data will include:

- a. Scores for quizzes, weekly tests, and the final test.
- b. A comparison of predicted times vs actual times to complete self-paced courses.
- c. Total setback time (amount of repeat training required in days).
- d. If applicable, reasons why the student attrited from the school.

During JOBS training, performance data obtained will be used as a basis for revising curricula and for improving JOBS selection standards. Upon completion of JOBS training, students will take a version of the Gates-MacGinite Reading Test and ASVAB (other than those taken when they entered recruit training). Scores on the two tests will be compared to determine whether or not JOBS training measurably improved the trainees general reading ability and aptitude SCORES. At the "A" schools, former JOBS trainees will be interviewed to identify potential problem areas and to obtain feedback on how students perceive the adequacy of the JOBS program in preparing them for "A" school. In addition, unsuccessful former JOBS trainees in Class "A" Schools will be interviewed.

Prospective students serving in the Fleet prior to attending JOBS will be rated on an NPRDC performance form (attachment 6) by their Commanding Officer. This form was designed by NPRDC at the suggestion of NMPC-48 because the standard rating form does not assess all of the performance variables required. This form will be completed and returned to Op-01 with a copy to NPRDC prior to a student's scheduled entry into the JOBS program.

JOBS trainees who graduate from "A" school will be monitored via the Enlisted Master Tape in order to follow subsequent progress and ascertain whether or not graduates have been recommended for reenlistment and/or advancement. Copies of performance forms will be provided to JOBS trainees supervisors to permit a follow-up assessment of graduates performance relative to other "A" school graduates. OP-01 will send out performance forms supplied by NPRDC.

B. Principal Research Questions and Related Data

This section presents the principal research questions that will be addressed during the JOBS test and evaluation. Following each question are the data elements and comparisons required to deal with the question. Although these questions are not exhaustive of the JOBS data sets, they are central to the purposes of the project.

Table 3
 JOBS Data Sets

Variables		
When Obtained	Predictor	Criterion
ECU Classifier Interview	Ethnic Background Education ASVAB Gates-MacGinite Reading Test RTC Performance	
Apprenticeship School	Performance Setback	Performance Setback
Fleet (Pre JOBS School)	Performance Discipline	Performance Discipline Attrition Recommendation of Commanding Officer for GENDET to attend JOBS
JOBS School	Entry Diagnostic Performance Remediation Gates-MacGinite Reading Test Questionnaire Data	Performance Attrition Remediation Gates-MacGinite Reading Test Classroom Observations
"A" School	Performance Setback	Performance Setback Attrition Interviews Questionnaire Data
Fleet (Post "A" School)		First Year Performance Promotions Recommendations for Reenlistment

Question 1. How do predicted and actual "A" school performance of JOBS students compare?

Regression equations will be used to compare the predicted Class "A" school performance of JOBS trainees with actual performance. The data upon which the regression equations are based were collected at the "A" schools between June and December 1977. These data are more comprehensive than those used for validating the ASVAB score, which only includes days to criterion or final school grade.

Question 2. Does JOBS training improve school-related and generalized basic skills?

Trainees will take a Job-related Basic Skills Diagnostic Test before and after training (alternate forms), and a form of the Gates-MacGinitie reading test (other than that taken earlier during recruit training). The differences in scores obtained will be used as indicants of school-related and generalized basic skill improvements, in addition to the evaluation measures embedded in the curricula. The ASVAB will be re-administered to determine any change in general aptitude.

Question 3. How can the selection of JOBS students be improved?

At present, students are selected for JOBS training based on ASVAB subtest scores and the individual's expressed interest in the program. To enhance the selection procedure, a student's JOBS and "A" school performance will be compared by performing a series of multiple regression analyses based on ASVAB scores and a number of other variables. These variables will include (1) years of education completed, (2) score(s) obtained on the Gates-MacGinitie reading test, and (3) stated career intentions.

Question 4. Does the promise of going to an "A" school reduce personnel turbulence in the Fleet among general detail (GENDET) personnel (i.e., attrition, desertion, unauthorized absences (UAs), disciplinary problems)?

JOBS volunteers and those rejecting the program will be compared as to attrition rate, desertion rate, UAs, disciplinary problems and other pertinent data. Data will be obtained from the Court Memorandum (NAVPERS 1070/607), Report of Separation from Active Duty (DD Form 214), and the Enlisted Performance Record (NAVPERS 1070/609). The Enlisted Master Tape (EMT) will be used to check the accuracy of some of this information.

Question 5. How do reenlistment recommendations, advancement exam performance, and job performance ratings for JOBS personnel compare with those of personnel fully qualified for "A" school?

JOBS students will be compared on other measures with fully qualified controls. The Enlisted Master Tape plus an NPRDC rating form will be the primary data sources.

Question 6. Is the JOBS Program a cost-effective method of dealing with the declining supply of higher quality personnel?

To answer this question, a cost-benefit analysis of the JOBS Program will be conducted. Life cycle costs will be compared against measured and predicted benefits of an operational JOBS training program.

Question 7. Can the JOBS Program assist in meeting EEO goals?

To answer this question, the JOBS test data will be used as a basis for predicting the percentage of minority personnel who would enter various ratings through the JOBS program. Predicted and actual percentages in these ratings will then be compared.

V. OPERATIONAL IMPLEMENTATION

Before the JOBS Program is implemented Navy wide, the following issues will be considered:

A. Organization

During the test and evaluation (T&E) period of the JOBS Program, students will complete JOBS training prior to entering Class "A" school and training will be conducted in traditional fashion (lectures, textbooks, etc.). This procedure is necessary to provide adequate data for evaluation purposes. In the future, however, it may be feasible to integrate JOBS training within the "A" school curricula, in either self-paced, group paced or traditional format. If this procedure is adopted, however, provisions will have to be made for "remedial loops" within the Class "A" schools. Thus, if a JOBS student begins to fall behind, set-back procedures would have to be implemented in order to provide adequate additional instruction in the deficient areas. The final decision on whether to conduct JOBS training prior to Class "A" school or to integrate the curricula of the two schools depends, in part, on future JOBS training sites and the instructional method that ultimately evolves (self-, group-paced, or traditional).

B. Location

If it is decided that students will complete JOBS training prior to attending Class "A" school, several options as to location of the JOBS training site are available. For example, if JOBS training was conducted at port areas, Fleet trainees could proceed directly to JOBS training, and on completion proceed directly to the follow-on Class "A" school. Adoption of this alternative would improve the efficiency of the system and probably reduce travel costs (since unsuccessful JOBS trainees would not be ordered to Class "A" School). A second option would be to colocate JOBS training sites with the Class "A" schools. This option would provide Class "A" School instructors with the flexibility to identify those students falling behind and send them to JOBS training for remedial instruction. These various options will have to be cost-analyzed to determine which would be most economical.

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C. Instructional Method

Regardless of organization or location, the JOBS Program will most likely end up in a self-paced format. This will not only allow students to proceed at their own speed, but allow them to receive training in only those modules required. It also allows for greater flexibility in assignment, since no waiting is required for a full class to be assembled and fewer instructors are required. In addition, it provides the JOBS student experience with the self-paced instruction characteristic of most of the class "A" school for which JOBS is preparatory.

Attachment 3

Schedule of JOBS Graduates Entering "A" Schools

JOBS Strands	Date	Student Input
Strand I		
Propulsion Engineering BT, EN, MM	Sep 79	24
	Oct	24
	Nov	24
	Jan 80	24
	Feb	24
	Mar	24
	Apr	30
	May	30
	Jun	30
Jul	30	
Aug	30	
Strand II		
Operations QM, OS	Jan 80	12
	Feb	24
	Mar	24
	Apr	30
	May	30
	Jun	30
	Jul	30
	Aug	30
Strand III		
Administrative/Clerical PN, YN, SK, RM	Feb 80	24
	Mar	24
	Apr	30
	May	30
	Jun	30
	Jul	30
	Aug	30
Strand IV		
Electronics AT, AX, AQ	Apr 80	15
	May	30
	Jun	30
	Jul	30
	Aug	30

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